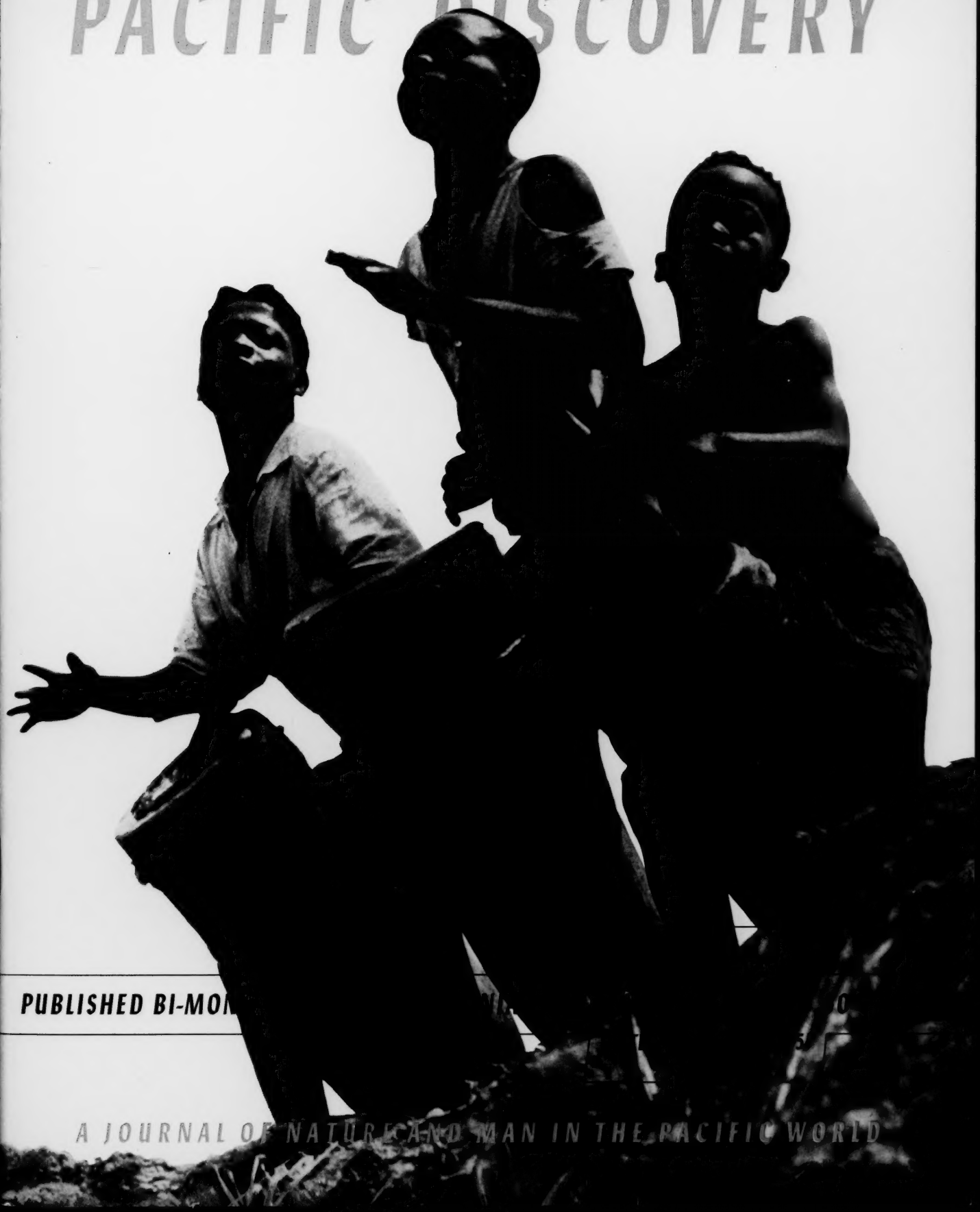
# PACIFIC DISCOVERY



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A JOURNAL OF NATURE AND MAN IN THE PACIFIC WORLD

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Founded in 1853

A JOURNAL OF NATURE AND MAN **PACIFIC DISCOVERY** IN THE PACIFIC WORLD

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**Vol. IV · No. 5**
**September-October**
**1951**

TREASURE, sunken or buried—what idea carries a higher charge of romance and adventure to most of us whose piratical other selves come to life only in books or, as to Walter Mitty, in daydreams? *Our* nearest to the real thing was finding, when twelve, a two-bit piece in the beach sands.

**PRE-DISCOVERY**

Take, for example of the other extreme, Harry E. Rieseberg. "Again I was getting restless . . . some pleasant weeks after returning from a most successful treasure salvage expedition. I knew what that meant. It wasn't exactly a question of whether or not I would take off again; what I had to decide was just where I was bound for this time." Our author is talking *fact* (next issue)—*PD* is still non-fiction. "There are always practical factors which enter into that choice: the exactness of one's information about a sunken ship wreck, how much money went down with her, how far away she lies, depth, working conditions, costs. And, complicating such considerations with me is that basic urge of the deep sea treasure salvor: he longs for new seas, new islands, untrodden sea bottoms, new ways to reach and bring up his find. Thousands of wrecks and a terrific lot of ocean spread around the globe. Where would it be this time?"

Romance enters at this point, decked out as lurid, alluring legend, but crying truth. His quandary resolved in favor of a reasonably sure thing lying on the bottom of Peru's Manta Bay, our treasure-bent author admits: "At the same time something else kept buzzing in my mind. In all the research work I'd been doing through the years, the name of Cocos Island was forever popping up—Cocos Island and the 'Loot of Lima,' the lodestar of treasure hunters for more than a hundred years." With "more than *four hundred* properly equipped and financed expeditions" on record as having tried to recover the fabulous treasure of the Lima cathedral allegedly buried on Cocos, there must be something in accounts of its capture and fate; if not, Rieseberg owed it to his profession to nail the myth to the masthead where its true colors would show. He came home with the facts—and treasure.

"WHO HATH smelt wood smoke at twilight?" **Harry C. James** asks. The Trailfinders have. President of that outdoor organization for boys, with headquarters at Lolomi Lodge, Banning, California, Mr. James has seen many boys become better men for the experience of wilderness. . . ¶Another value of wilderness is the scientific. Writing from Eugene, Oregon as associate professor of science in the General Extension Division, Oregon State System of Higher Education, **Dr. Ruth E. Hopson** knows the particular worth of the Three Sisters Wilderness Area—she studied it intensively for her Doctorate. . . ¶Central feature of the California Academy of Sciences' new Hall of Astronomy, "The Foucault Pendulum", at once demanded more explanation to visitors than a placard could provide. **Benjamin Draper,** executive producer of the Academy TV show "Science in Action," **A. S. Getten,** chief designer of the Morrison Planetarium instrument being built in the Academy shop, and artist **Alan Atkins** did the four pages which will be reprinted as a leaflet for sale at the information desk. . . ¶**Borys Malkin,** Academy research associate in entomology, spent this summer in Alaska—he is not still in Africa as his "Angola Report" might lead you to believe. Various exigencies have delayed publication of this part of his African notebook, as well as the last, which will appear soon. . . ¶**Dr. Edward S. Ross,** curator of insects in the Academy, leads off a new department on how to do this and that in the nature line, by telling "How to Photograph Insects"—how he does it, at least, with a candid camera. Until we think up a better name—what's *your* suggestion?—a department for collectors, et al., will operate, more or less regularly, under "What's Your Hobby?" D.G.K.

**DISCOVERING PD'S AUTHORS**

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**THE COVER COPY**

Downbeat in Angola—three drummer boys of the Kioko tribe, northeastern part of Portuguese West Africa. Photo by Borys Malkin.

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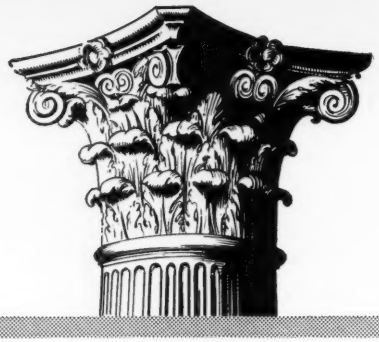

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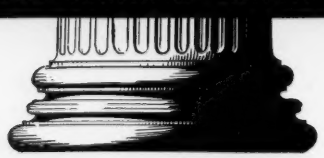


# EDITORIAL

## Bird Voices of the Autumn

COMES A DAY AT THE END OF SUMMER when we are all at once aware of a subtle change in the course of nature. The sun shines warm, but with a subdued and golden light, filtered through a barely perceptible aura of autumn haze. The hills stand blue in the distance, while close at hand the fields are brown and gleaming with the richness of harvest. The air is still, and permeated with a pungent, nostalgic odor compounded of the smell of burning leaves, the aroma of ripened grain and drying hay, and the gentle fragrance of clusters of grapes weighing down the vines and of apples ready for the cider-press. Indian summer has begun.

Other times of year may be more colorful, more stimulating, more exciting, but none is lovelier nor provides a richer measure of contentment. Indian summer is a season of quiet contemplation and fulfillment. Nature seems to have paused and – like an experienced farmer surveying the abundance of his fields and orchards – to be looking the situation over and calling it good.

These warm, delightful, sunny autumn days, clear overhead but hazy toward the horizon, are one of the special rewards of living in temperate North America. The very name Indian summer is token enough that the early settlers in this land had nothing in their previous experience with which to compare it. St. Luke's summer and St. Martin's summer – British terms for interludes of warm weather in the autumn – refer to specific, limited periods in October and November. Indian summer is a name for days of uninterrupted autumn sunshine which, in a good season, can last from harvest-time almost to the winter solstice.

The *Century Dictionary,* which disposes of such terms as Indian red, reed, reservation and rice with brief cross-reference, quite properly devotes an extended passage to Indian summer, from which we quote in part:

> in the United States, a period in autumn characterized by calm and absence of rain. This condition is especially well manifested in the upper Mississippi valley, where it is in conspicuous contrast with the climatic phenomena which precede and follow it. West of the belt of States lying adjacent to the Mississippi the rainfall is so small that the chief characteristic of the Indian summer is not exceptional enough to excite attention; and from the Mississippi valley eastward, the autumnal periods of calm and dryness become more and more irregular in their occurrence, and are, on the whole, of shorter duration. Hence, in the Eastern States any period of unusually quiet, dry, and hazy weather, even if it lasts only a few days, may be designated the Indian summer, provided it occurs at any time between the middle of September and the early part of December . . . The name is due to the fact that the phenomena of the Indian summer are much more distinctly marked in the region chiefly occupied by the Indians at the time this term became current than they are in the more eastern regions . . .

Then the editors of the *Century,* having discharged their obligation to the austere discipline of lexicography, really let themselves go when it came to providing lyrical references to the subject under discussion as illustrations of usage:

> That delicious season known as "*Indian Summer*" is often prolonged into December, when a calm, soft, hazy atmosphere fills the sky, through which, day after day, the sun, shorn of his beams, rises and sets like a globe of fire.
>
> *J. W. Foster,* The Mississippi Valley, p. 205.

> What visionary tints the year puts on,
> When falling leaves falter through motionless air!
>
> *Lowell,* An *Indian-Summer* Reverie.

> The warm late days of *Indian Summer* came in, dreamy and calm and still, with just frost enough to crisp the ground of a morning, but with warm trances of benignant, sunny hours at noon.
>
> *H. B. Stowe,* Oldtown, p. 337.

We are loath to pick flaws in the *Century Dictionary,* which – with the Bible and Shakespeare – we would probably carry out first if the house were on fire; but the above definition, by implication limiting Indian summer to the Mississippi Valley and eastward, obviously was written by someone unfamiliar with the West. On the Pacific slope the phenomena of Indian summer are well defined, and are evident in some degree all the way from Lower California to Alaska – earlier in the north, and briefer, therefore all the more to be remarked upon and cherished.

In the Pacific states Indian summer brings us some of our finest weather, and in coastal regions where there is considerable summer fog it constitutes quite a definite, well-marked season – the long, warm, golden interlude between summer fog and winter rain. It is almost a second springtime, only more subdued and mellow, with more subtle nuances of light and color and sound.

Nature has to be learned by ear as well as by eye. Every experience of the out-of-doors has a sound accompaniment – the crash of a waterfall,

the roll of thunder, the sighing of wind in the trees, the crackling of twigs or the swish of grasses as little animals move about their business, the voices of insects and birds. Indian summer has its own complement of musicians, and its own musical score which, lacking the wild rapture of spring, requires more careful listening. If spring provides the crescendo of the symphony, autumn gives us nature's chamber music.

There is the industrious hum of bees, the rhythmic stridulation of grasshoppers, and the cheerful chirp of crickets which — as the weather grows cooler — will find their way indoors to sing their autumn song around the fireplace. And there are the voices of birds, almost unnoticed till we try to contemplate what an Indian-summer day would be without them.

On a sunny morning in September the juncos pursue one another with cheerful trills and twitters, their song more playful and varied than the somewhat monotonous "territorial" chant of spring—a serious business then, when the males take up their posts and by persistent song announce their possession of the nesting area and their intention to defend it against all comers. Now the responsibilities of the nesting season are over, food in the form of ripened seeds of weeds and grasses is abundant, the sun is warm, and life is good. Flashing the white inverted V of their outer tail feathers, the juncos dart about with all the happy abandon of children on a picnic.

One hears the nasal *yank, yank, yank* of a wandering nuthatch, the shrill cry of a sparrow hawk, the loud shouts of jays — hardly musical sounds, yet each contributing in its own manner to the character of an Indian-summer day. From the distance comes the lilting trill of a white-crowned sparrow, while close at hand a Bewick wren tries a few exploratory notes, like someone practicing scales and runs on the piano. A pair of wren-tits, mated throughout the year, slip unobtrusively about among the shrubbery, conversing with one another in lovely, liquid syllables, occasionally interspersing gently scolding notes that provide just the right accent to this otherwise too perfect example of conjugal felicity.

The robins begin to gather into flocks. One notices half-a-dozen robins in the yard, and thinks perhaps it is a robin family. Then he sees a score or more of robins on a neighboring lawn, and presently they are going about in flocks of two or three hundred. Robins at this season are comparatively silent, especially considering the size of their flocks; however, they frequently give familiar robin calls, and occasionally, on any sunny day, a short phrase of song.

Many of the bird voices of autumn seem vaguely plaintive and at least one, the *tiu, tiu, tiu* of the rufous-crowned sparrow, sounds downright querulous. Happily it is unlikely that the little feathered complainants feel as dejected as they sound.

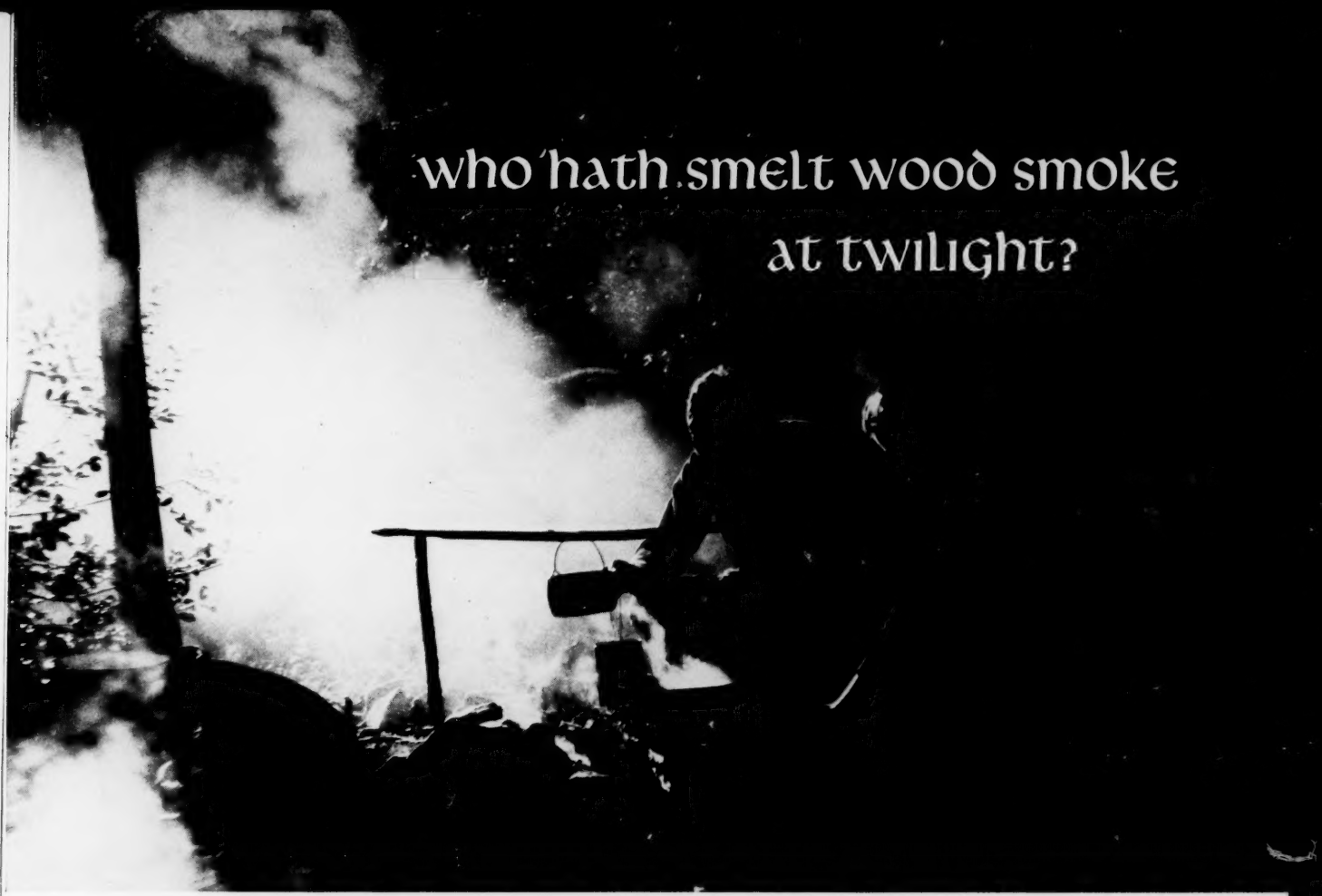
Most familiar of the plaintive voices of the autumn is that of the goldfinch, which in its several local races is found throughout most of North America. As goldfinches move about in little flocks in September and October, feeding on weed seeds or flicking out thistledown, their purling calls, marvelously sweet yet tinged with melancholy, bring to Indian summer the gentle sadness of remembered yesterdays.

There is another autumn voice that is still more poignant. As the days grow shorter and the noonday shadows lengthen to the northward, there comes one day a call so indescribably sad and sweet that it might almost be the voice of a disembodied avian spirit. Three notes there are in a descending cadence, not in the diatonic but in a chromatic scale. They have been compared to the opening bars of "Three Blind Mice," but this is only a loose approximation. "Oh, dear me," says the bird, recounting its woes, and then in a different key and with altered emphasis, it repeats, "*Oh, dear* me," as if its heart were bursting with all the sorrows of the avian world. This is the song of the golden-crowned sparrow, newly arrived on its winter feeding grounds; and when one hears it, he inevitably thinks of the lines of William Cullen Bryant:

> The melancholy days are come, the saddest of the year,
> Of wailing winds and naked woods and meadows brown and sear.

But nature never leaves us to despair. Even the melancholy days hold promise of happier ones to come. Just as the tide of out-door life seems at its lowest ebb, in the late, dark mornings of December, the Anna hummingbird begins its courtship, and in coastal California the song sparrow bursts forth with its nuptial song. Nature seems ever to be looking forward. Even as the dying year approaches its end, there are bird voices to remind us that we have passed the winter solstice, and that already the days are lengthening toward spring.

R.C.M.



# who hath smelt wood smoke at twilight?

*". . . On a wilderness camp food becomes a major consideration."*

## HARRY C. JAMES

THE SUMMIT SADDLE was directly ahead. In spite of our slow, deliberate pace through the loose broken lava we soon would be there and we knew that then the great sweep of the Painted Desert and of the Colorado Chiquita would be spread before us.

For five summers we had attempted to climb Arizona's San Francisco Peaks, but every previous summer we had been beaten down by Wagnerian storms that deluged us with water, thrashed us with hail, terrified us with lightning, and deafened us with thunder crashes. But now we were going to make it! At long last we would be on top of the Hopis' Mountains of the Kachinas, and we knew enough of the country to anticipate the view that we would have.

Slowly we struggled on, stopping every twenty-five to fifty feet to get our wind. We reached the saddle and found—a road!

The view was everything we had anticipated—the hundreds of graceful, velvet-coated cinder cones diminishing in size as they approached the Little Colorado; the great gash of the river itself; the tongue of lava extending into the canyon, forcing the river out of its channel and making the spectacular Grand Falls, the only dusty water in all the world; the splashes of color beyond the Little Colorado, truly a Painted Desert; the vivid blue-red of Garces Mesa. "Are those the Hopi mesas?" — "Is that Oraibi Butte?" — Yes, we were thrilled by the view and overjoyed we had at last climbed the San Francisco Peaks.

We had known that a road had been built up the mountainside some years before, but we had not known it had been constructed right up to this point. Somehow the edge was taken from our experience. We left the road behind as we went on to the summit of Mt. Humphreys, but its scar was

always in the foreground of our vision and in the forefront of our thinking. It was, at this point, as unobtrusive a bit of dirt road as one could imagine, but it did not belong in the picture, and the landscape was the poorer for it, and certainly the thrill of our experience was lessened by it.

Teachers, religious leaders, probation officers, social workers, all constantly ask me, "How can we best inculcate a spirit of reverence and develop a decent code of ethics in our young people of today?"

My answer always is, "Get them out on the trail. Give them a chance to experience a little real wilderness camping."

I certainly realize that a true camping experience is not the answer to every problem in juvenile delinquency, nor will it fill every deficiency in character in every person; but I have seen what it can do for hundreds of boys in my thirty-five years of camping with them through the Western states.

The primeval forest, the alpine heights, the desert wastelands, the endless sweep of ocean — from time immemorial these have challenged the best in man. They will continue to challenge the best in youth. Spirituality and morality are but latent in man, and I am confident that camping experiences in the wilderness serve most effectively to draw out these implicit character traits and make them dynamic — which after all is what true education should mean.

The wilderness must, however, be unspoiled if it is to truly challenge, so my aim has ever been double — to give boys a wilderness camping experience and to fight to keep the wilderness inviolate.

A few years after our experience on the San Francisco Peaks another group of boys was camping with us in the Tetons. Paul Petzoldt, the famous mountaineer, had given the group a few lessons in mountain craft, and finally was prevailed upon to take us up the Grand Teton.

Even the few odds and ends we carried with us in light packs made the climb from Jackson Hole to the base camp in the saddle between the Grand and the Middle Teton a good stiff pull for all of us — except Paul! We had left the cars in the meadow at the foot of the trail, and with the sure plodding steps of the mountaineer Paul led us up and up the mountainside and into Garnet Canyon. We stopped and rested from time to time, ate our lunch, took a salt tablet or two, and plodded on.

We stopped for a while at Petzoldt Cave where many a good mountain climber has found refuge from the sudden storms of the Tetons. We crossed

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*". . . So that every boy is able to go by himself to some isolated view-point to get his first view of the Grand Canyon completely alone."*

great fields of snow and ice, and finally we reached the saddle. Here Paul had cached a number of alpine tents, sleeping bags, primus stoves, and other gear, and soon we had camp in order for the night. Hot drinks were brewed, and monstrous sandwiches of home-made bread with inch-thick slabs of tender elk meat served wonderfully well to take the edge off even the fantastic appetites of adolescent mountain climbers.

Then the sunset began — a pageant of color encompassing the entire sky! Even the great piles of cumulus clouds over the Wind River Range against the eastern horizon were masses of pastel pinks and of delicate gray-blues. As the sun slipped down toward the Sawtooth Range, dark against the western sky, the moon rose. The eastern sky still retained its delicate hues, and as the moon climbed up among those softly tinted clouds, the sun in a riot of flaming reds sank behind the sharp and jagged skyline.

As the sun sank lower and lower the silhouettes of the Teton peaks were etched across Jackson Hole. As we watched, these shadows stretched out and out across the level light-gray plains. Even our own shadows lengthened out against the broken rock of the saddle and of a few low-hanging clouds below us.

In just a few minutes the sun was down and the spectacle was over. Perched on great broken irregular blocks of granite, we had been spellbound. As darkness and a cold wind joined us on the saddle we whispered ourselves to the tents and our welcome warm sleeping-bags. Even the glorious thrill of the climb to the summit the next day has been dwarfed in the memories of the youngsters by the experience of that sunset.

If an enterprising hotel man of Jackson had succeeded some years before in building a road (God forbid!) up to that saddle, would our experience have been the same? The sunset would have been just as vivid. The shadows still would have slipped silently and swiftly across the sagebrush plains. The climb the next day would have been just as thrilling. But the road scar there would have diminished, would have ruined, that inspiring experience just as effectively as had the road up the San Francisco Peaks when we climbed Mt. Humphreys.

I am sure that the emotion we all felt as we watched the sunset from the Teton saddle was, in the very finest sense of the word, the religious emotion — the same emotion, the reverence, that a devotee experiences during a service in a great cathedral. I am also sure that same emotion would be destroyed in that cathedral if the beauty of the architecture, the glory of the stained glass, and the surge of noble ecclesiastical music were punctuated by a series of incongruous loud-speakers hanging here and there throughout the church, or by a sheet-metal stove erected to add sufficient warmth to the confessional corner.

It has been our custom when we camp at Grand Canyon so to plan our trip that we can make camp without any of the party having a chance to see the canyon itself. After all the necessary work is done we then assemble the group and arrange so

*". . . The only dusty waterfall in all the world"— on the Little Colorado River, Arizona.*

*"The primeval forest, the alpine heights, the desert wastelands, the endless sweep of ocean – from time immemorial these have challenged the best in man . . . The wilderness must, however, be unspoiled if it is to truly challenge . . ."– the top of Columbia Finger, Yosemite National Park.*

that every boy is able to go by himself to some rather isolated view-point and get his first view of the Grand Canyon completely alone. We plan so that there is no opportunity for that experience to be spoiled by any interruption. Only too frequently one's first glimpse comes from the rim near one of the hotels where undoubtedly some thistle-brained mentality will have to make a bright-crack to reassure himself against the terrific immensity at his feet.

While at Grand Canyon we also always plan an overnight trip into the Canyon. Sleeping out down in the bottom of the canyon is another never-to-be-forgotten experience. When darkness settles down over the gorges and the brilliantly-colored temples and buttes and pinnacles and battlements lose their color and become gigantic dark masses towering above one to the stars, then one has a sense of the immensity of the Canyon that he never gets from any view along the rim. The over-expanded soul of the most arrogant adolescent shrinks to proper size through such an experience. Would that happen if there were an automobile road down there?

As a result of these experiences every boy who has been on a Grand Canyon camp with us has

**Photographs by the Author**

*Wilderness experience, with all its spiritual and ethical values, cannot be achieved if there is "a road or a hot-dog stand or a slot machine in the picture . . ." – exploring a glacier.*

remembered all his life the feelings he had in viewing that greatest of all natural spectacles for the first time.

True wilderness camping demands of and forces upon the most aggressive and the most selfish an appreciation of the absolute necessity of coöperation and of consideration for the feelings and individual traits of the other fellow. The books on exploration are full of stories illustrating how some petty harmless idiosyncrasy can irk and annoy almost to madness under the tensions of intimate living in camp. Remember the tea and teapot incident in *Kabloona*?

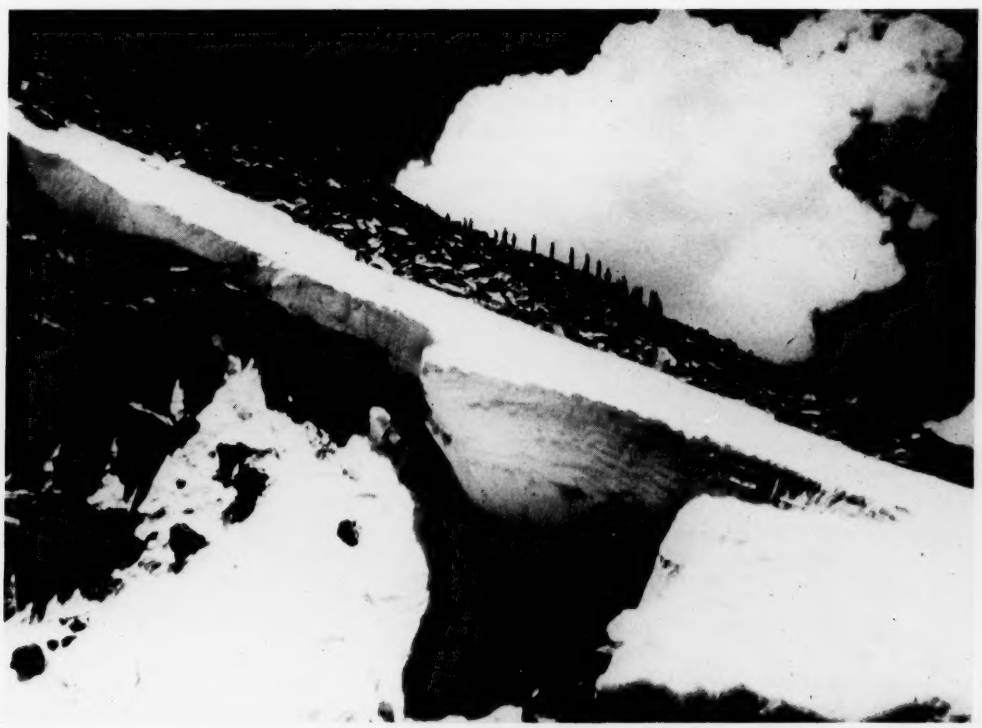
In wilderness camping we have to learn to "take" such things, to reason them out in their proper perspective. Only under wilderness conditions is this valuable emotional training and understanding possible.

It seems hardly necessary to mention that wilderness camping, demanding as it does the complete care of one's self with the minimum of gadgets, certainly offers the finest of all training in self-reliance, not in selfish rugged individualism, but in true soul-satisfying self-assurance.

As for ethics, can one imagine any situation better calculated to impress a boy with the 24-carat value of the Golden Rule than that offered by a genuine back-country camping trip? It is truly amazing to see what happens to a selfish, aggressive adolescent when he has his first experience in being roped-up for a bit of training in rock-climbing. Respect and consideration for others develops very quickly under such circumstances!

To the average American boy of today water comes from a faucet, heat from a furnace, food from a grocery store or from the family deep-freeze. His bed is always comfortable. He hardly ever knows what it is to be truly hungry or really thirsty. All these things are presented to him by his home environment with little or no effort or thought on his part. If he wants fun he is very apt to sit and get that fun presented to him by the movies, or by radio, or by television. Even the slight effort that reading requires is gradually being diminished by the comics with their visual presentation of stories accompanied by a minimum of actual words and a maximum of strange animal-like noises.

When that same boy goes on a wilderness camp food becomes a major consideration. Its careful



*"Get them out on the trail. Give them a chance to experience a little real wilderness . . ." — on Mt. Dana, Yosemite National Park.*

selection and its proper preparation become matters of the utmost importance. Water no longer spouts from the faucet. It has to be secured by physical effort on his part from a source he knows is satisfactory. He will have heat only if he works for it by securing proper wood in adequate quantity. "Chop your own wood and it warms you twice." As for fun, he and his companions will have to make their own.

The summer-resort type of camp with its program of athletic contests, synthetic crafts, movies, and television gives none of this important experience to its youthful campers. They are comfortable and well fed, but the intellectual and spiritual aspects of camping are only too frequently noticeable by their absence.

During the last war I was surprised one day to get a letter from China. It was from a young man who had camped with me years before. Meantime I had lost track of him completely and I had presumed that his experiences with us had been just as completely forgotten by him.

The letter, a lengthy one, told how he had been flying the hump over the Himalayas between India and China and how on one flight something had gone wrong and they had crashed during the night. When morning came he found that the chief pilot had been killed and that as next in command he was now in charge of the little group of five survivors. They outfitted themselves as best they could from the wreckage of the plane, and by careful study of their maps the navigator determined that the only way out for them was a 500-mile trek through some mighty rough country.

The writer described all their preparations for the long hike in great detail, and then went on to say, "You know, the important thing about all this was that my experience in wilderness camping when I was a kid made me realize that I could do it. I never doubted that I could make it and the assurance I felt in my heart that it could be done seemed to reassure the rest of the party. By the time we came to the first Chinese village our boots were just about gone – but we *had* made it!"

Many of our boys have often taken their sleeping-bags and tramped off alone (with their leader's permission, naturally!) to make their beds in some isolated but inspiring spot – under some great tree, at the foot of a magnificent rock, or on a shelf commanding a sweeping view. There they have spent the night, all alone, out of sight and sound of anyone else. Once in a while some youngster has come back to camp in the middle of the night, unable to stand the ordeal – for ordeal it is for many a youngster, used as today's children are to almost constant companionship. However, the few boys who have come back have been encouraged to try it again. They usually did, and they usually succeeded.

It is difficult to analyze why to spend a night in this way is a valuable character-building experience for a teen-age boy, but it is. And it is valuable, I am sure, because of its spiritual connotations—it somehow helps to satisfy the desire to experience something bigger, grander, than the self. Certainly that would not be experienced or would be completely negated if there were a road or a hot-dog stand or a slot-machine in the picture, or if the air were incensed not with pine and wood-smoke but with gasoline and Diesel fumes.

Experience in real wilderness camping not only serves to give a boy that sense of self-sufficiency which carries him through some major emergency out-of-doors, but it also develops in him a thorough self-reliance which keeps him from following a wrong lead or from acting quickly on some unfortunate impulse. I am convinced that this is a major reason why of all the thousands and thousands of boys who have been with us on camps not one youngster has ever become a delinquent. I am sure also that every boy who has had the soul-satisfying adventure of wilderness camping and whose nostrils have really known "The sacred incense of the high places of the earth" has had a truly spiritual experience. END

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*"We are a part of the wildness of the universe. That is our nature. Our noblest, happiest character develops with the influence of wildness. Away from it we degenerate into the squalor of slums or the frustration of clinical couches. With the wilderness we are at home."*

—HOWARD ZAHNISER*

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* Executive Secretary of The Wilderness Society; Editor, *The Living Wilderness.* From an address, "How Much Wilderness Can We Afford to Lose?" at the Second Wilderness Conference Dinner, March 30, 1951, published in part in the *Sierra Club Bulletin,* April 1951.

RUTH E. HOPSON

# Three Sisters—The Worth of a Wilderness

PHOTOS BY THE AUTHOR

NATURE'S PROCESSES ARE CONTINUOUS. At any one time a particular area that has been relatively undisturbed by man is of unusual significance to the student of her forces. Through observation and interpretation of such areas, with the aid of our constantly increasing background of scientific knowledge, understandings may come that will be of immeasurable benefit to mankind.

Pressure of population as well as failure to recognize the need for these natural areas as "checks" or "norms" to be used in the wise management of our crop lands, whether timber or agriculture, may result in lack of suitable areas being set aside and protected.

The U. S. Forest Service has recognized the need for preservation of such regions for recreation and watershed values as well as for scientific use. A *wilderness area* is an area of at least 100,000 acres characterized by primitive conditions of transportation and habitation. The boundaries must be at least one-half mile back from any route of motorized transportation. *Wild areas, virgin areas,* and *natural areas* are similar but each is successively smaller.

The Three Sisters Wilderness Area in the Central Cascade Mountains of Oregon fulfills the need of the field scientist for an outdoor laboratory in which to observe Nature's processes continuously. This volcanic region is of unusual significance because of the range of its elevation, the variation of its topography and the gamut of its geological ages from the late Miocene or early Pliocene to the present.

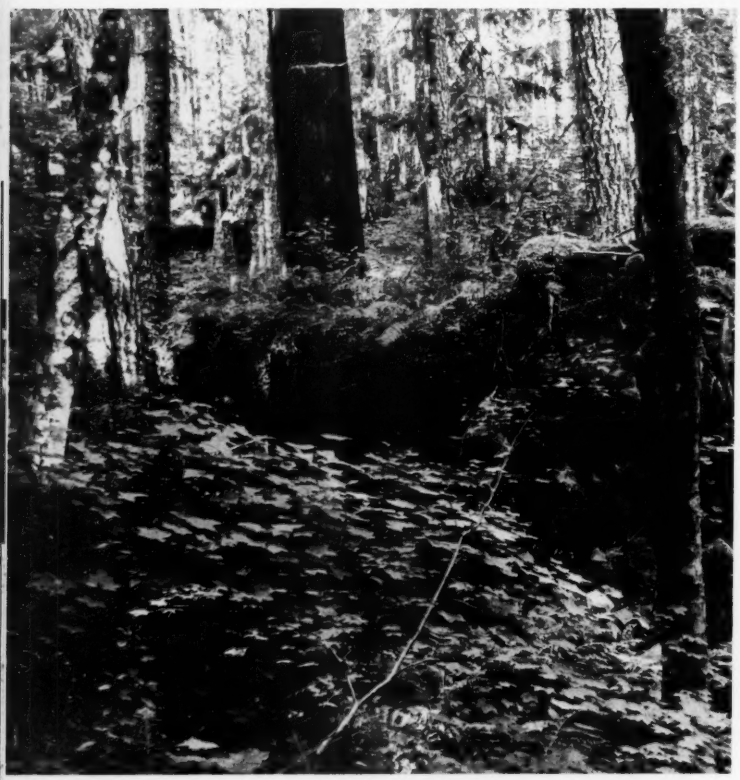
Evidences of vulcanism dominate the Three Sisters Wilderness Area—vulcanism altered by action of glaciers and running water, by range of elevation, and by various periods of time since each succeeding volcanic activity.

Every rock within the area is volcanic in its origin; every peak can be identified with volcanic processes. Lava flows, extensive in area and in depth, may be traced back in time by degree of modification toward soil formation and by vertical position in the series of lava flows that built the high plateau of this part of the Cascades. Recent cinder cones and volcanic peaks rise above the plateau and deep valleys are carved within.

From the summit of the South Sister, 10,354 feet, to the point where Separation Creek joins Horse Creek at 1,900 feet, is a continuous succession of plant and animal life adapted to conditions of climate, topography, and soil characterized by this range of elevation. Scientists have defined "life zones" to denote the dominant plant and animal associations that occur under these conditions. Here within a distance of approximately twelve miles, four of these life zones are

*The Middle Sister still retains the form of a volcanic cone upon which little erosion has taken place. Lines of trees on the ridges mark the irregular boundary between the Arctic Alpine and Hudsonian life zones.*

*Between the North Sister at the left and the Middle Sister at the right lies Collier Glacier, Oregon's largest. The blocky lava flow came from Cinder Cone, out of the picture just to the left of the North Sister. This is a completely volcanic landscape.*



*The forest of the Humid Transition zone along Horse Creek Trail contains Douglas fir, grand fir, Western hemlock, Western white pine, Western red cedar, and Western yew. The fallen log covered by a growth of ferns, shrubs, and seedling conifers exemplifies continuous growth.*

found. From higher elevation to lower they are respectively: the Arctic Alpine zone, the Hudsonian zone, the Canadian zone, and the Humid Transition zone. These zones overlap each other since the boundaries are never sharp.

Above timber line on the Three Sisters, at approximately 7,500 feet, is the Arctic Alpine zone. Bright yellow composites form scattered patches of gold throughout this zone. Even though the flowers are large in proportion to the rest of the plant, the total picture of the region is one of barren volcanic rock and snowfields, stern and rugged. The little clumps of showy flowers and of less conspicuous rushes, sedges, and grasses appear as welcome relief from the vast expanse of fresh volcanic rock.

Animal life is sparse in the Arctic Alpine zone. In the summer, neophyte mountain climbers are surprised to find delicate butterflies swept above the summits of the mountains by the strong air currents or flitting from flower to flower in the lee of some large boulder.

Hepburn's rosy finch is the only bird reported to be a summer resident. This species nests in ledges of lava jutting from snowfields above timber line and feeds on insects that have been dropped on snowfields by treacherous air currents. Clark's nutcracker feeds on the cones of the white-bark pines at timber line and often flies to crags above. Pine siskins, Cassin's purple finches, and Sitka crossbills are also frequently seen in this border between the zones. Often attracted above timber line by pentstemon and mimulus are the rufous humming birds. Soaring on updrafts of air, the golden eagle is sometimes seen swiftly overtopping the summits of the mountains.

Few mammals make use of this zone. Hollister's chipmunk is found infrequently throughout. Above timber line these chipmunks find shelter under loosely piled rocks and food in the juicy, tender herbs and the matured seeds of the mountain flora. Near timber line, the dusky cony occupies the talus below the ridges. Numerous elk tracks, even to the summit of the Middle Sister, indicate that these animals make some use of this high, desolate region.

Man also finds values in the Arctic Alpine zone: water that is stored in glaciers, scenic grandeur, recreation, and an outdoor laboratory for scientific research and for educational use.

The scenic value of the Three Sisters is salient. Their height, a little over 10,000 feet above sea level, makes them prominent features of the landscape. These three mountains stand ready to tell their story of volcanic cones in various stages of glacial erosion to all who wish to stop and look. When covered with glistening snow, they arise above the green forest like three huge ice cream cones. As a part of the north-south chain of volcanic mountains, their arrangement of three closely spaced cones is unique. Fourteen

*A glacier passed here, on The Husband, grooving the rock with hard stones embedded in its bottom. Jointing in the andesite controlled the Pleistocene glacier's action, making this giant flight of steps which I call "Paul Bunyan's Stairway." The trees, forming a balustrade, are mountain hemlocks.*

glaciers occupy cirques in the sides of the Three Sisters; Collier Glacier is the largest.

The next zone below the Arctic Alpine is the Hudsonian, extending from timber line down to the forest of lodgepole pine and true firs, from an altitude of approximately 7,500 feet to one of 5,500 feet. West of the Three Sisters, this includes a bench-like plateau three or four miles wide, also The Husband and the summits of Substitute Point, Proxy Point, and of several peaks on the ridges farther west.

The Hudsonian zone shares most of its plants with either the Arctic Alpine above it or the Canadian below it. No trees occur here that do not also occur in the Canadian zone. The Hudsonian zone is characterized by lack of lodgepole pine and by a predominance of mountain hemlock. Alpine fir is much more frequent than in the Canadian zone and amabilis fir is less frequent. White-bark is the principal pine, although Western white pine occurs rarely. Creeping dwarf juniper outlines rocky ridges and exposed situations, going down into the lower Canadian zone.

The topography of the Hudsonian zone in this region is that of extreme youth. Fresh blocky lava flows, cinder cones of varicolored pyroclastics at steep angles of repose, plains covered with volcanic ash and sand, extensive reaches of black volcanic glass called obsidian, numerous exposures of gray andesite with either platy or blocky fractures, and exposed volcanic dikes and conduit fillings are outstanding features of this area. The obsidian and andesite form perpendicular cliffs as much as 300 feet high. Where the platy andesite occurs, loose shale-like fragments produce a ringing clatter when walked upon. Delighted hikers call this rock "dinnerplate." Occasionally the hoof-beats of a deer or elk crossing these rocks can be heard ringing out across the meadows.

Glacial action during the Pleistocene, or last ice age, added much to the beauty of the landscape in the form of roches moutonnées (rocks worn round by glacial action), glacial groovings on exposed rocks, and rock-basin lakes.

Since the Pleistocene, running water has been the most effective geological agent. Present-day streams form a dendritic pattern of drainage, radiating from the mountains. During July and early August the roar of the rushing waters is echoed back and forth and picked up by mountain winds until the ventriloquial quality of the sound makes it difficult to locate.

This is a region well suited to the observation of running water at work. Besides the usual activity of the swift mountain streams, torrents of glacial water, released almost instantly from natural storage lakes when the pressure becomes too great behind the morainal or ice dams, produce almost incredible changes within a few hours. The two major glacier-fed streams are White Branch from Collier Glacier and Separation Creek from Eugene, Skinner, and Lost Creek Glaciers. Twice I have just missed seeing one of these streams on a rampage, once by hours only.

The Canadian zone is found at approximately 5,500 feet to 4,500 feet in elevation. The forest of this zone has the distinction of containing the largest number of tree species of any of the life zones of this region. Not in any one place, but within the Canadian zone in the Three Sisters Wilderness Area, are the following species of conifers: Mountain hemlock, Western hemlock, Douglas fir, grand fir, amabilis fir, noble fir, alpine fir, white-bark pine, Western white pine, sugar pine (on Rebel Rock), lodgepole pine, ponderosa pine, Engelmann spruce, and dwarf juniper.

In the higher and newer Cascades lodgepole pine is the dominant tree of the Canadian zone. This species is also shown on the U. S. Forest Service maps of forest types as occurring along a high ridge that extends from the newer Cascades like a peninsula to Olallie Mountain. However, at least on Horsepasture and O'Leary mountains at the northern extension of this ridge, I did not find any lodgepole pine. Here the hemlocks and true firs comprise the major part of the forest. Since these trees follow lodgepole pine in known forest sequences, this ridge forest of the older Cascades is probably nearly a "climax forest type." Because this forest type is not known to occur within the higher and newer Cascades, it is significant that at least a part of the outer ridges are protected within the Three Sisters Wilderness Area. Although these ridges have so far had little attention from scientists, a number of problems there should interest ecologists.

The upper part of the Humid Transition zone occurs in the stream valleys between approximately 4,500 and 1,900 feet, the lowest point in the Three Sisters Wilderness Area. Most of this forest is Douglas fir. Associated with it are: Western hemlock, grand fir, Western yew, Western red cedar, incense cedar, and Western white pine. Near the streams a luxuriant growth of several species of ferns and numerous herbaceous plants form the ground cover. If the dense canopy of a typical forest of Douglas fir is broken, shrubs such as vine maple and flowering dogwood spread their leaves to catch the filtered light. Where the old growth Douglas fir forest is still found, the ground underneath is virtually a biological desert. Little light penetrates to the forest floor through the continuous crowns of these trees.

The activities of most of the birds and larger mammals are not confined to one life zone throughout the year. A large protected area, continuously forested with the different types of trees such as I have described, tends to provide the natural conditions necessary to maintain the native fauna in its natural balance with the predators and the hunted. This is one of the few regions where the timber wolf is still found. Bear, cougar, bobcat, and coyote are here also.

The importance of predators to the stability of a region was well stated by Aldo Leopold: "I have watched the face of many a newly wolfless mountain, and seen the south-facing slopes wrinkle with a maze of new deer trails. I have seen every edible bush and seedling browsed, first to anaemic desuetude, and then to death."

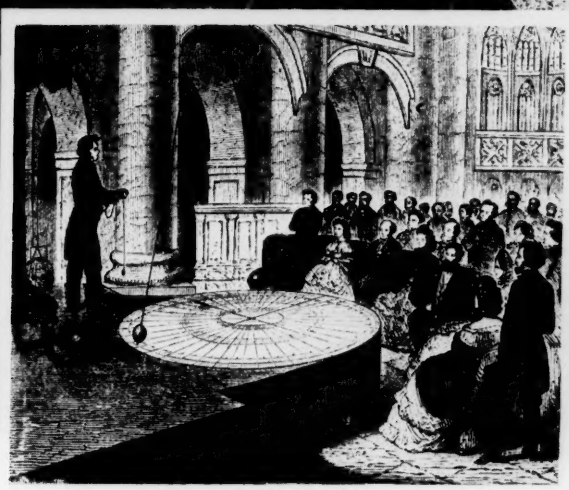
The broad, deep, glaciated valley in which Separation Creek now flows is a part of a watershed that extends from the summit of the South Sister at 10,354 feet to the junction of Separation Creek with Horse Creek at 1,900 feet—all within the Three Sisters Wilderness Area. The four life zones that were previously described here extend in regular succession in this drainage. Such a valley serves as a corridor along which plants and animals have migrated for centuries. The high, steep sides tend to hinder migration across them. Separation Creek, deep within the wilderness, protected by broad buffer strips from outside influences, is highly significant as a natural laboratory where many secrets of the Western Cascades can still be learned.

Scientifically, the Three Sisters Wilderness Area is only partially explored. No doubt the region still hides knowledge concerning vulcanism, glaciers, lightning effects, weather and climate, cosmic rays, flora, fauna, and perhaps other fields.

The time may come when the great educational value of this region will be more widely recognized and more use will be made of it. Some day the public schools as well as the colleges may hold summer camps within range of these four life zones, where teachers of the outdoor sciences may build on the simple motivation that comes from living with the endless variety of nature to develop appreciations and understandings that are real.

Ecologists in the East are spending much time trying to restore natural conditions on the basis of the meager evidence that is left. While virgin areas are yet available in the West, adequate provision should be made to insure their perpetuation in all types of regions and including all types of habitats. The magnificent diversity of the Three Sisters Wilderness Area, as it now stands, provides opportunities for many future scientific studies that should lead to greater understanding of the processes continuously at work there. Application of this knowledge may aid in the management techniques through which man endeavors to control his environment. END

# The Foucault Pendulum



**BENJAMIN DRAPER**

TWENTY-FIVE HUNDRED YEARS AGO man knew or at least theorized that the earth was a sphere rotating on its axis. But only a century has passed since this fact was mechanically demonstrated and proved by physical laws.

Today, watching a Foucault pendulum, with some knowledge of the principles involved, men can understand and actually observe in effect the earth's rotation under this free-swinging ball suspended on a wire.

Léon Foucault, a French scientist, in 1851 performed with clarity and simplicity an experiment that enabled men to observe by the swinging of a pendulum that the earth rotates. Before that time proof lay in the apparent revolution of bodies around the earth —the sun, moon, and stars.

A Foucault pendulum—there are several in this country*—is simply a heavy ball suspended by a long wire and free to swing in any plane. Beneath it a circle is divided into degrees or other convenient intervals so that the viewer can watch the clock-wise apparent change in the position of the pendulum as it swings. What is actually happening is that the earth is moving while the pendulum continues to swing in the same plane.

To understand Foucault's experiment, it is well to recall something of man's knowledge of the earth up

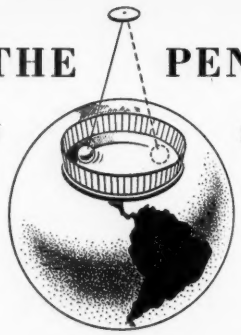
*(Continued on page 17)*

*Notable ones are at the National Academy of Sciences in Washington, D.C., the Griffith Planetarium in Los Angeles, and the one here described at the California Academy of Sciences, San Francisco.

*Foucault's experiment was first performed just 100 years ago. You may see it today in a number of leading scientific institutions. The bronze ball above swings in San Francisco. (Elmer Moss)*

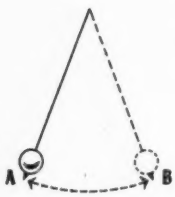
# HOW THE PENDULUM WORKS

By A. S. GETTEN



Drawings by ALAN ATKINS

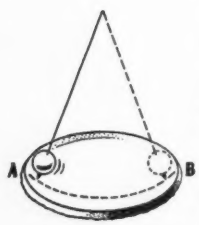
**Imagine** yourself far enough away from the earth to see it rotate and to watch the pendulum swing—




**Newton's First Law** states that a body in uniform motion will, unless some external force is applied to it, remain in uniform motion with its direction fixed.

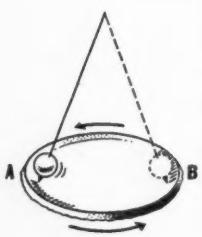
Thus our free-swinging pendulum will continue to swing in the same direction, *A* to *B*, unless some external force changes its course.

**Here is how Foucault did his experiment**




He erected a pendulum, an iron ball suspended by a long wire. Beneath it he placed a circle of sand. A pin attached to the bottom of the ball traced a line through the sand each time the pendulum swung across the ring.

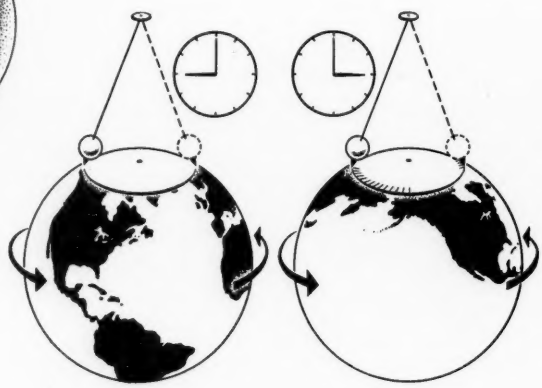
Foucault noted that each succeeding mark in the sand appeared to fall slightly to the right of the last. After watching a few minutes, he was satisfied he had not imagined this shifting. The plane of oscillation of the pendulum was apparently progressing in a clockwise direction.




Since Newton's Law does not provide for any such progression but states that the direction of motion must remain fixed, it was clear that the earth was rotating beneath the pendulum—

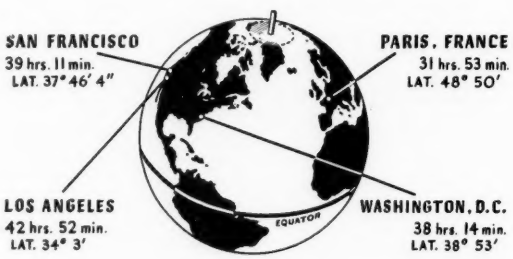
**The first visible proof that the earth rotates on its axis.**

In other words: the pendulum was always swinging in a fixed direction—*A* to *B*— and the circular ridge of sand, attached to the earth, was revolving underneath the pendulum as the earth moved. Foucault observed at Paris that it took 32 hours to complete the circle of marks in the sand. Why not just 24 hours?



**How Foucault explained the time variation—**

Picture the pendulum as swinging directly over the North or South Pole, at latitude 90°—the earth rotates under it in 24 hours, and the pendulum completes its apparent circle of progression in exactly the same time but in the opposite direction. If we move the pendulum to the Equator, however—latitude 0°—the earth's axis will be at right angles to it, and no such apparent progression will be possible. At points between the Poles and the Equator, the time it takes to complete the apparent circle of progression increases as we




move away from the Pole. Foucault calculated these changes, found that the increase was governed by a definite ration between time and latitude—and proved his theory.

**One more WHY**—The question is sometimes asked: If the pendulum swings in a building, doesn't it move with the building? The answer is NO — *because* the pendulum is free to swing in any direction while the building, attached to the earth, has to rotate as the earth does.

to his time. The oft-repeated story, that Columbus, by observing how ships sailing out to sea gradually disappeared over the horizon, was the first to deduce the world was round, is not borne out by history.

### The Greeks

The earliest recorded doctrine of a spherical earth comes from Pythagoras, or his school, in the sixth century B. C. Later, Pythagorean astronomy involved the assumption that the earth rotated about its own axis and also revolved around a "central fire" in a day and a night, or twenty-four hours—a diurnal rotation.

Gilbert, a biographer of Foucault, wrote with barbed elegance: "It was a singular error, professed for a long time, until the days of Galileo, his friends and his enemies, that Pythagoras had the honor of this ingenious invention, the rotation of the earth. To the Greek philosopher, however, the world was in truth spherical, but it was perfectly immobile, the center of the universe."*

By the time of Aristotle, in the fourth century B. C., nevertheless, the theory that the earth rotated had wide support among Greek scholars. These men believed, contrary to present astronomical knowledge, that the sun revolved around the earth.

### Copernicus

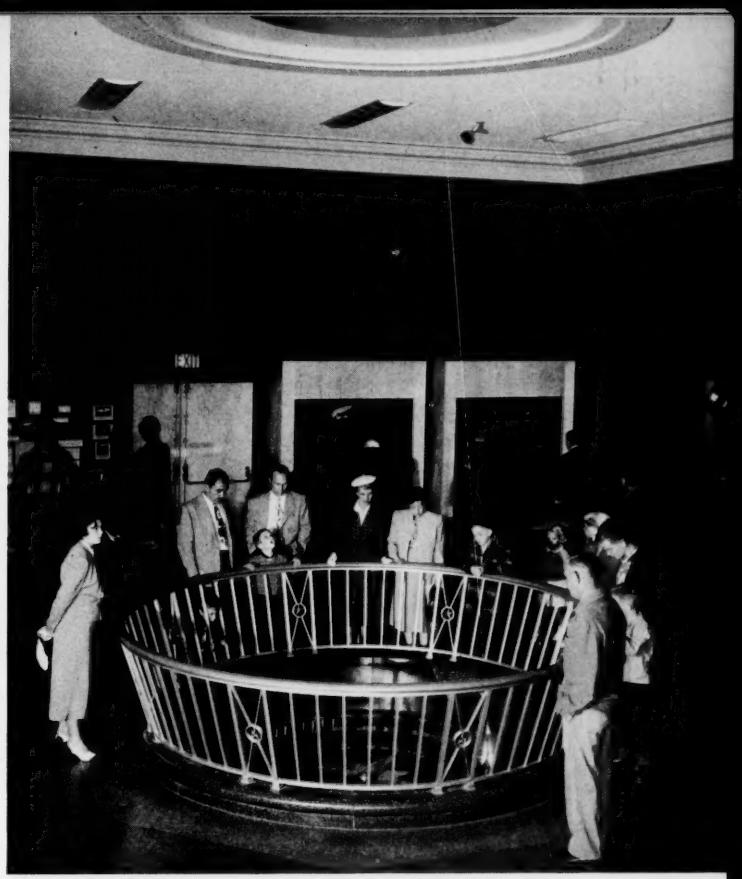
It was not a Greek but a Polish astronomer, Nicolaus Copernicus, who in the fifteenth century A. D. advanced the theory of the movement of the earth and other planets around the sun. Copernicus discovered that not only did the earth make a diurnal or daily rotation on its own axis but that it traveled in a pathway around the sun, making a complete journey in the space of a year.

The Copernican theory, the foundation of modern astronomy, was proved by a young Italian nobleman, Galileo Galilei, when in 1609 he first turned the telescope to the skies. Being in advance of his day, Galileo was for a time imprisoned for his views. The Edict of 1616 declared anyone a heretic who said the earth rotated.

### Accademia Del Cimento

A few years after Galileo's death, a handful of his pupils formed in 1657 at Florence, Italy, the Accademia del Cimento, an academy of experiment. This academy lasted only a few years but its grand folio, published in Italian in 1667 (and afterwards translated into Latin) is a landmark in the history of science. In their work members of the Accademia very nearly hit upon the mechanical demonstration of the earth's rotation. Quite probably it was lucky for their own sakes that they did not for the theory was at that time in official disfavor. Vincenzo Viviani, Galileo's companion during the last years of his life, one of the

*Ph. Gilbert, *Léon Foucault, sa vie et son oeuvres scientifiques.* Brussels, 1879.



*Foucault pendulum at the California Academy of Sciences. (Moss)*

first members of the Accademia and a geometrician, is credited with the following statement:

"We have observed that all pendulums suspended by a single thread deviate from their primitive vertical plane and do so always in the same direction." As will be seen, this observation is the basis of the pendulum experiment developed by Foucault.

But the Accademia was doomed to short life. In 1667, ten years after its founding, the group had met with such opposition that it disbanded. J. Bertrand, the French scientist and another of Foucault's biographers, in recalling the Accademia pendulum experiment, wrote: "It cannot be supposed that the academicians *del Cimento* had not searched for the cause of an effect so extraordinary but it was a delicate matter, dangerous to partake in. They had known Galileo; the misfortunes of their illustrious compatriot were very recent."*

The brief start which the Accademia del Cimento had made at mechanical demonstration of the rotation of the earth is the only record of similar observations relating the laws of the pendulum to the physics of the globe until the middle of the nineteenth cen-

*Introduction to *Recueil des travaux scientifiques de Léon Foucault,* publie par Madame veuve Foucault sa mere. Mis en ordre par C.—M. Gabriel. Paris, 1878.

tury.* The academicians observed a constant deviation of the pendulum, a phenomenon without apparent cause. Nor were they able to assign the cause to the performance of the pendulum. It was Léon Foucault who saw in it a token of the earth's rotation.

### Foucault's Experiment

In the basement of his laboratory, under a 6.5-foot ceiling, on January 8, 1851, Foucault first performed his experiment. On February 3, 1851, he gave a physical demonstration and communicated the results—*"Démonstration physique du mouvement de rotation de la terre au moyen du pendule"*—to the physics section of the French Académie des Sciences where it was heard by commissaires Arago, Pouillet, and Binet.

The description Foucault presented takes little more than a page in the *Comptes Rendus* (Volume 32, 1851) the official record of the Académie. Foucault's experiment, says Gilbert, "excited great emotion and provoked interesting research theories."

Through the interest of Dominique Arago, permanent secretary of the Académie, Foucault was able to perform his experiment at the Observatoire de Paris, this time with a pendulum 11 meters long.

Foucault's experiment was to establish his free-swinging pendulum, then construct a circular ridge of sand beneath it in such a location that a pin attached to the bottom of the swinging ball would cut into the sand and leave a trail at each swing. When the ball was first put in motion, it was drawn aside by a cotton cord and left for hours to come absolutely to rest. The cord was then burned with a taper. The pendulum started to swing back and forth without a jar, in a true plane.

The viewer observes that the plane of the pendulum's swing begins at once to rotate, slowly to the right, clockwise. The pin on the ball cuts ridges in the sand in a new place at every swing, shifting at a uniform rate which will carry it around in a circle if the pendulum does not come to rest. In fact what was happening, Foucault observed, was that the floor of the building was really and visibly turning under the unchanging plane of the swinging pendulum. The earth, moving counterclockwise, as it does, contributed to the illusion that the pendulum was moving in a clockwise circle in its oscillation.

The fact that at Paris thirty-two hours would be required for the pendulum to complete a circle was explained by Foucault with mathematical preciseness. At the North Pole, he reasoned, twenty-four hours would be required, and at the Equator no motion would be observed. Foucault noted a time differential between these two points. He calculated that at a latitude of 54°, twenty-eight hours would be required; at a latitude of 41°, thirty-five hours; at a latitude of 19°, seventy-one hours; and at a latitude of 5°, it would take practically eleven days. Paris, at 48° 50′, as stated, required about thirty-two hours. Berlin, 52° 30′, took thirty hours and one-quarter.

The mathematics necessary to figure the ratio is not complex. Foucault's theory indicated that the angle of the apparent rotation of the pendulum in a given time was equal to the angle through which the earth rotated in the same time multiplied by the sine of the angle of the latitude of the place where the experiment was made, and is expressed in the equation:

Angle of rotation per hour = sine of lat. x 15.

Without question the calculations proved the theory correct. When his mathematical computations for the 48° 50′ latitude of Paris were checked, Foucault had established his theory.*

Foucault had other opportunities, four in all, to perform his ocular or visible experiment on the grand scale. At the Panthéon in Paris, at the wish of Napolean II, he suspended an iron ball, a foot in diameter, from a 67-meter wire. On this occasion an electromagnetic device, which he developed, permitted a prolonged demonstration.†

Again in 1855, for the Universal Exposition, Foucault repeated the experiment where great numbers of people saw it. M. Maumené, another French scientist, performed Foucault's experiment in the Cathedral at Rheims, with a 40-meter wire and a 19-kg. sphere, in May 1851, and again at Amiens Cathedral in June 1868.

Foucault's demonstration was reported to the Royal Society in London on May 15, 1851 when it heard a note read by Sir Charles Wheatstone, one of its Fellows, "on M. Foucault's new mechanical proof of the Rotation of the Earth." The Royal Society awarded Foucault its Copley Medal in 1855 and elected him one of its Foreign Members on June 9, 1864.

Far from anti-climactic, Foucault in pursuit of proof of the rotation of the earth invented the gyroscope in September 1852. . . . *"Du gyroscope, la plus belle peut-être des creations de Léon Foucault,"* wrote M. Gilbert. For this notable achievement he received wide acclaim and great honors. Within a few brief years after his appearance at the Académie in 1851, Foucault was elected a member. He invented the Foucault polarizer and other physical science devices for microscopic and optical research and made improvements in the electric arc. His distinguished career terminated with his death on February 11, 1868. END

*An interesting review of all the experiments on this question will be found in "Les preuves mecaniques de la rotation de la terre" by Ph. Gilbert. *Revues des questions scientifiques,* vol. 11–12, p. 23.

*For the complete apparent rotation of the pendulum at the California Academy of Sciences in San Francisco, at 37° 46′ 04″ N. Latitude, the time required is 39 hours, 18 minutes, and 6 seconds.

†Foucault describes this device in the *Travaux,* p. 337.

# Angola Report

BORYS MALKIN

*Kioko boys slap out dance time with their hands, in Murieje, Angola.*

***Sixth in a series of reports from the field by the California Academy of Sciences one-man entomological expedition to Africa***

THE UNCOMMON HELPFULNESS OF THE PORTUGUESE to a traveler I mentioned in the last part of this seemingly endless log of my one-man African expedition.* Kindnesses in Angola confirmed the opinion with which I left São Tomé—this notwithstanding my departure by ukase.

To start things off well in Angola, Mr. Samuel Ebling, our consul in Luanda (now in Southampton, England), got me out of the jam and protected me from too much suspicion of the police. He then put me on the right track with an introduction to Dr. John Grosweiler, botanist in the Angola agricultural department, who in turn got me in the good graces of the department's director. Consequently, whenever I went through one of the provincial agricultural stations I could count on the very generous coöperation of members of the department. Dr. Grosweiler also gave me much useful information about Angolan flora and fauna.

Senhor Manuel Albergheria, director of the agricultural station in Malange, made possible a most interesting trip to the Lunda province, perhaps the best part of my Angola travels. No less am I indebted to Dr. and Mrs. Tucker of the Evangelical Mission in Luanda, who helped a great deal with miscellaneous advice. Dr. Tucker, a Canadian, I met in São Tomé two days before my ignoble deportation from the island, and it was at his suggestion that I sailed for Luanda instead of returning to the Cameroons via Fernando Po and, probably, a Portuguese jail — the wisdom of his advice became obvious only later on.

Landing in Luanda was without immediate trouble —I had, at least, a visa for Angola. Not so my five companions of the passage *from* São Tomé, the zoölogical party from Oxford University who were refused landing permits because they didn't have the necessary visas. His Majesty's Consul General did some long

*"Passage to São Tomé," *PD*, September-October 1950, pp. 18-21.

*Baobabs are scattered over the plains near Luanda.*

and powerful talking before the expedition could disembark, with its gear, in Luanda. But after that, obstacles were relatively minor, although the first two weeks we had to keep within the immediate vicinity of the port—foreigners must have a *giya*, a police permit, to move about the country. While the authorities deliberated over us, and tried to find out what was behind my expulsion from São Tomé, we could work within a short distance of Angola's largest and oldest European settlement.

Founded by Paolo Diaz in 1575, Luanda – São Paolo de Loanda – is an attractive town with briskly colored houses, pink and yellow and green, mostly. It is orderly, and relatively clean (compared to Lagos, for example). Around it, the arid, sandy belt stretching from the Congo estuary to Lobito showed the natural effects of the dry season. With rain still months off, drought had hold of the vegetation. The many great baobab trees were leafless; all other trees were suffering, except the spectacular *Euphorbia conspicua*, cactus-like in appearance and adaptability. We collected what we could.

Since the five Oxford boys had rather varied specialties, I usually traveled with George Gradwell, entomologist of the group. Although working for different institutions we coöperated easily.

Poor as it was, the fauna around Luanda differed vastly from what I later found in the interior. In the garden of the British Consulate General, George and I scaled several trees in search of embiid colonies – a new species of these silk spinners covered several with their webs. A few isolated castor oil bushes harbored great numbers of chalcid wasps and lady beetles of the genus *Scymnus*, and we found a waterhole twelve miles from town infested with aquatic insects. Meanwhile David Snow, ornithologist of the expedition, and David Wasawo, general zoölogist (from Kenya), went after birds; Ian Galbraith the photographer snooped around with his camera; only Martin Routh was missing—his specialty, dolphins, had taken him to sea off the Cuanza River estuary.

Alone, I made trips to near-by towns in an even drier area. Once, turning over a block of concrete in Catete, I saw a large swarm of minute crickets in an ant colony. Scooping up forty or so of these wingless, soft crickets, no more than an eighth of an inch long, I was rather puzzled. Later, my friend Dr. Ashley Gurney of the U. S. National Museum kindly identified them. It was nothing new, a cosmopolitan species, in fact, first described from Colombia in 1877 and since found in such far-flung places as Cuba, India, Hawaii, and the Egyptian Sudan – always with the same species of ant. My find was the farthest south in Africa, and – sure enough – with the right ant. The cricket *Myrmecophilus americanus*, derives its generic name from permanent association with ants, the orthopterans, we may surmise, giving their hosts some desirable secretion in exchange for protection and leftovers from the *Prenolepis longicornis* table.

Thus while we waited for the cops to weaken we collected a fair amount of stuff. Two weeks passed, then the Oxford party sailed for another try at São Tomé (they made it this time) and I had my *giya* for two months in the interior. The authorities apparently decided there was no future in suspecting me of whatever they suspected me of. With arrangements for stops at various agricultural stations in my pocket, I was off by rail for N'Dalatando, otherwise known as Vila Salazar after Portugal's indestructible dictator. Here I spent the next few days at one of the stations, collecting in the country close around.

Vila Salazar, even though much higher than Luanda and within Angola's "wet" forest belt, has little of its original vegetation. Coffee plantations have replaced the forest, only a few trees left standing to shade the coffee bushes. Cooler climate and heavier clouds marked the higher elevation.

Cloudy days were ideal for expeditions of the army and Ponerine termite raiding ants. The latter, which I had often seen in the open country of the Cameroons, were here in large numbers. One day I came across a raiding party which I followed to its objective, a termite colony apparently hidden under ground. Thousands of slain termites, nevertheless, lay

in the grass, the ants busily collecting and carrying them, sometimes five or six at once, back to their own nest, a huge hole in the ground some 30 yards away. There was constant two-way traffic, with probably more than a thousand raiders in sight at one time. For the half hour I watched there was no diminishing of traffic; it was the largest raiding party I ever saw, and must have been sent afield by a huge colony. Hundreds of other raiding parties I've observed ranged from 80 to 300 ants. It seems most likely to me that the termite victims become food for the ever hungry ant larvae, though I did not actually see what became of them in the Ponerine nest.

After an altogether pleasant and successful time in Vila Salazar I went on to Malange, capital of the province of the same name. The train crawled slowly upward on its dry, dusty track – I was reminded of Colomb-Béchar in the northern Sahara. Nearly 2,500 feet above sea level, Malange is cooler than Vila Salazar, better for both coffee and other plants that need temperate climate. Between the two places lies an open savannah with a scattering of baobabs and scanty population. Where an occasional village lay near the railroad, gangs of boys would greet the passing train with yells and yelps.

In Malange I met Senhor Albergheria, who took me the 18 or 19 miles out to his agricultural station, where he also lives. The next week he asked me if I wanted to go with him on a ten-day trip to the Lunda province up in the northeast corner of Angola. Naturally I jumped at the chance, it being unlikely I would get to this distant province on my own. The trip stretched to more than two weeks.

It took two days to drive to Saurimo, capital of Lunda, over a better road than any I saw in Nigeria, though the savannah here was in a way reminiscent of the Nigerian, only sparser. Close to Saurimo there is a change in the landscape, the black soil yielding to red laterite, with a loss in fertility. Slow-flowing but perfectly clear rivers meander through swamps where many waterfowl hide. We passed a night in Xassenque, district of the native Angolan antelope, the giant sable. This animal is strictly protected, only a few specimens allowed to reputable scientific institutions, though natives trap and hunt it where they can for food.

We made Saurimo our base for several days, taking off to other points as Senhor Albergheria's business

*Senhor Manuel Albergheria, director of the Angolan agricultural station at Malange, was my host for two weeks of travel in northeastern Angola.*

*What happened in 10 years at Saurimo – native agricultural practices caused this huge gash in once fertile earth.*

required. Collecting was most profitable in the province, despite the dry season – days were hot but tolerable with no humidity, and nights were cool.

Chief peculiarity of Saurimo is perhaps the great canyon or barranca dug by a relatively slow and shallow stream. We went to look over this shocking example of erosion. It is a grave problem to my host and guide, who is an expert in conservation as well as tobacco growing, and a great admirer of conservation work done in the United States. To me it was a remarkable phenomenon.

Now over 300 feet deep and a few hundred yards wide at the top, this canyon has been formed entirely within the past *ten years.* The rainy season in this region is brief but violent, and the swift erosion is helped along by the native cultivator. He plants his staple crop, cassava or manioc,* in regular rows of tiny mounds, in such a way that drainage channels form between the rows – running directly down hill! Strengthened and speeded by the channels, runoff water takes the soil along in its rivulets, to the stream, to the river, to the sea – the ancient story of man against the land.

Each year erosion gains momentum. Contour plowing might have checked it, or switching to another crop not requiring the rows of little mounds. But the outlook now is dismal. Agricultural stations are few in Angola, the territory vast. Education can gradually bring new ways; but it takes hundreds of years to form new soil where it may have been skinned off the land in a single season. I humbly suggest that *Time's* editors delegate one to step down from the editorial armchair to this portentous canyon in Saurimo. Perhaps he will learn something not visible from a New York skyscraper.*

Our next field HQ was Nova Chaves, about 125 miles east of Saurimo. The four days we spent there, staying at the district administrator's house, I found most profitable. After Saurimo the country was, again, entirely different – sandy with short but fairly dense savannah grass. There was good collecting in some of the sand-dwelling insects, but it was exceptionally poor in the aquatics, especially beetles, of the wide

*This plant is said to have been introduced from the Amazon basin. Although yams are the staple food of West Africa, I saw none planted in Angola.

*Cf. "Of *Time* and Survival," by A. Starker Leopold, *PD,* November-December 1948, pp. 28-29.—Ed.

↑ *We crossed the Chicapa River near Saurimo on a ferry that was typical of equatorial Africa.*

← *Native ferrymen sang as they pulled rhythmically on the line across the Kasai, boundary river between Angola and Belgian Congo.*

**Photographs by the Author**

*Huge granite outcroppings marked the plateau on which Angola's highland capital, Nova Lisboa, is built. The sun-helmeted viewer is Mr. Duarte, entomologist at the agricultural station.*

swamps along the river. By now, I had gathered much evidence against the common notion that the tropics are invariably swarming with vast numbers and kinds of insects. I used to enjoy far better aquatic collecting in Poland's Pripet Marshes – in central Europe! Collecting in the tropics around the world, I have found only New Guinea measuring up to the ideal. Of course the "tropics," in terms of latitude, contains every condition from steaming jungle forest to desert to cool upland to snow-capped peaks. Generalizations are obviously meaningless.

The farther east we went in Angola the greater were the swampy areas, yet despite increasing wetness the aquatic fauna became progressively poorer. This was no fluke of geography, but showed up a general tendency in tropical "hot" swamps of relatively low elevation. "Cold" swamps of temperate latitudes and equatorial swamps above 6,000 feet have a remarkably rich fauna – insects, birds, fish. The "hot" swamps lack sufficient oxygen for the survival of basic plankton forms and small animals which are, in turn, essential food for the larger animals.*

In Angola, my observation of the insect fauna showed that the region of Vila Salazar and Malange was related to Nigeria and the Cameroons, the forms in many instances very close if not identical; the Lunda area, on the other hand, as I learned later, was more closely related to the Angolan uplands from the south. Corroboration of my notions came unexpectedly when I asked Dr. Grosweiler about the flora. The plants of Lunda, he said, were related to those of the Kalahari sands, far to the south and well in the interior; those of Angola's northwestern upland shaded into the flora of the wetter regions of the Congo and farther north.

All this country is peopled by the Kioko (Quioco in Portuguese), like the Ovimbundu of southern Angola one of the largest tribes in the colony.* The Kiokos are chiefly cassava agriculturists; they are also hunters, with bow and arrow – firearms have not penetrated here to the extent they have in Nigeria and the Cameroons. In common with most of this Portuguese colony, their villages are few and far between, which gives the country an empty look. This is fortunate in a way – I thought of smaller but overpopulated Nigeria with a population close to 25 million in comparison with Angola's estimated four to five million.

From Nova Chaves we went to Dilolo, across the border in the Belgian Congo – this was a one-day sightseeing trip. We crossed the Kasai, one of the

*See *Inland Waters of Africa,* by E. B. and S. Worthington. 1933.

*See *Source Book for African Anthropology,* By W. D. Hambly, Chicago Nat. Hist. Mus. (Field Museum), 1937; by the same author: *The Ovimbundu of Angola,* 1934.

Congo's great tributaries, on a Portuguese government-owned ferry operated by a dozen natives. The black men sang as they bowed rhythmically back and forth, pulling us toward the other shore by the heavy ropes. There was obvious pleasure in their activity. Various phrases uttered in succession without directing from anyone yet with perfect timing created a strange and wonderfully rhythmical song – wherever I went in Black Africa this talent for song, this sense of rhythm, and the faculty of dancing were present, no matter how depressed and lowly the native. Unfortunately, "canned music" and synthetic dance from our world –without tradition or meaning, having no connection with their life – make rapid inroads, particularly in "progressive" West Africa. Progress is always a mixed blessing–trash and gems come alike, the sifting not very selective, especially in the large towns.

We spent only a few hours in Dilolo, making purchases – imported goods are much cheaper in the Congo than in Angola – and started back to Nova Chaves in the very hot afternoon.

*A girl of the Humbi makes up with ornaments what she lacks in more conventional attire– near Sá da Bandeira.*

Africa still spells adventure to many of us, but an incident in Murieje, another Kioko settlement on our way north from Nova Chaves, only emphasizes the usual peacefulness of my progress in that continent. We were guests for the day of a Portuguese trader, only European in the area. Senhor Albergheria tried his hand at hunting, without success. I fared better with my camera and nets. Numerous species of tiger beetles ran along sandy roads, and in the surrounding hamlets dancing went on, and drumming, as usual, to accompany the merrymaking. In the afternoon we drove back toward the trader's house. Suddenly Sr. Albergheria stopped, pointing toward three red cows only 25 yards away from our pickup, and 15 yards from the nearest house. Quickly he drew his gun and fired, but in the excitement forgot to recharge – birdshot did little damage to the buffaloes (I was slow to recognize what they were) who fled in panic followed by a drove of natives. Thus ended my sole encounter with African big game, which, in the parts I visited at least, had to be hunted to be seen.

After Murieje we went to Dundo on the northeastern border in the lush rain forest of the Congo basin, where diamond mining is the richest industrial enterprise of the Portuguese colony. I had very good luck with the insects, but only for a few hours as we returned to Saurimo next day. After another day there I parted company with Senhor Albergheria who had to return to Malange while I decided to head toward the southern part of the colony.

A few days in Vila Luso, capital of Mochico province, confirmed my impressions of eastern Angolan insects – many land forms but few aquatics even where conditions seemed perfect. Before I left, the director of the local agricultural station took me to some small canyons along the river to see how the erosion problem is being hopefully met by planting of bamboo and elephant grass.

Nova Lisboa, 5,000 feet up in the coastal highland, was a very different world. Angola's capital is on a high plateau, more than twice the elevation of Vila Luso, yet the rise is so gradual that it is no more perceptible to the traveler than the climb from St. Louis to Denver. The countryside appears level, with eucalyptus plantations, not very interesting. As we approached Nova Lisboa in the night, cold rain and penetrating wind told the high altitude.

Next morning, walking along the outskirts of town looking for the agricultural department headquarters, I ran into a mating flight of the large *Megaponera* ants – the night's rain had brought them out. Winged males were flying everywhere and alighting close to the nearest nest to seek females. But the winged females were few, and the males usually tried to mate with the workers which took their advances in bad temper. Annoyed workers ran about nest openings

*This is the easiest way to carry your baggage – if you are used to it.*

angrily, seeking out amorous males and killing them off with sting and mandible.

Having walked nearly six miles, I found the department just one block from my hotel! I called upon Mr. Duarte, a Cambridge-educated entomologist, who arranged with the director for a truck to take me collecting all next day. We left early and soon discovered more interesting country.

After the dreary uplands approaching Nova Lisboa, here was a variety of unspoiled vegetation. Widely scattered, enormous granitic outcroppings, like so many ruined castles, were a striking note, contrasting with high green hills in the distance. A few isolated outbursts of rain, foreshadowing the main season of plenty, had fallen earlier, and now flowers were out in full force with great numbers of insects upon them.

Leaving Nova Lisboa after a few days, I had an interesting trip to Sá da Bandeira, still in the uplands, to the south.

About 60 miles south of Nova Lisboa the country changes very suddenly. The vegetation becomes entirely xerophytic, thorny plants and acacias take over. There are no signs of rain, and this without apparent change in topography. The natives – Humbi and Angambwe–are tall and slender. Their dress is scanty, as in the cool uplands of Nigeria and the Cameroons, but both men and women wear elaborate ornaments. Men frequently wear necklaces of animal teeth; women have very complicated headdress and heavy adornment about the neck. The men are muscular in contrast with the miserable Angolan lowlanders; the women, when young, are very attractive, with delicate features and–for the Negro–quite high noses and narrow lips. Until the ethnographic history of Angola is better known, it cannot be said with any certainty what non-Negroid strains are present in these people.

At several thousand feet above sea level–the agricultural station near-by is nearly 7,000–Sá da Bandeira is considered Angola's health center. It is a pleasant place, with the usual cheerfully bright buildings of the Portuguese colonies. The situation is dry and rocky, but I had excellent collecting along gravelly stream bottoms. After just two days, however, I had the chance to drive north with Senhor Matos, owner of Luanda's large automobile shop, and his wife, with whom I had traveled since Nova Lisboa.

So we turned north again, toward Luanda. The road to Lobito on the coast leads through extremely rocky country, desolate and arid. It rolls down and is crooked and uneven, and the farther it went the worse it got. This was still savannah but untouched by human hands, the grass growing very high. Game is plentiful, it is said, including the elephant, but we saw only a few antelope.

We reached the coast at Benguela, stopped overnight in Lobito, and went on coastwise to Porto Amboim. But meanwhile the road had become intolerable and the tiny Renault was progressively falling apart. In fact disintegration was so far advanced, broken springs included, that we hit Porto Amboim very late–got there at all only because Senhor Matos was able to keep part of the motor together with a piece of string! For a while we considered leaving the car and flying to Luanda, but we had it repaired overnight sufficiently to get us to Luanda late next day.

During our enforced stopover I had nearly a full day to collect and study the country. This, too, was a very dry zone, with aloes, baobabs, and euphorbias just as around Luanda. Before Porto Amboim we passed several canyons cut into an inland escarpment which suggested an ancient sea level. These canyons were green and fresh, unlike the surrounding country, some showing remarkable stratification.

One month and three thousand miles after leaving Luanda I was back. I found mail at the Consulate. Among the many letters was one from the California Academy of Sciences with funds to enable me to go on to South Africa. There was no time to celebrate the good news–a Portuguese ship, the *Imperio,* was sailing for Cape Town in four days. I had to pack, buy my ticket, get police permission to leave the colony, and so on. Even so, I wound up with a day to spare, just time to revisit the small waterhole a few miles east of town, and the garden of the British Consulate. My luck was good; I finished my Angola collecting with over a thousand more water beetles, and some more specimens of the silk web spinner for Dr. E. S. Ross at the Academy who is engaged in a world study of this interesting order of insects. END

EDWARD S. ROSS

# How to Photograph Insects

*Sitting on a rock in a sunlit redwood glade, this tiny robber fly (family Asilidae) was too busy sucking the body fluids out of a leafhopper to notice the steady approach of the lens. Ranging from under a quarter to two inches long, Asilids are the hawks of the insect world.*

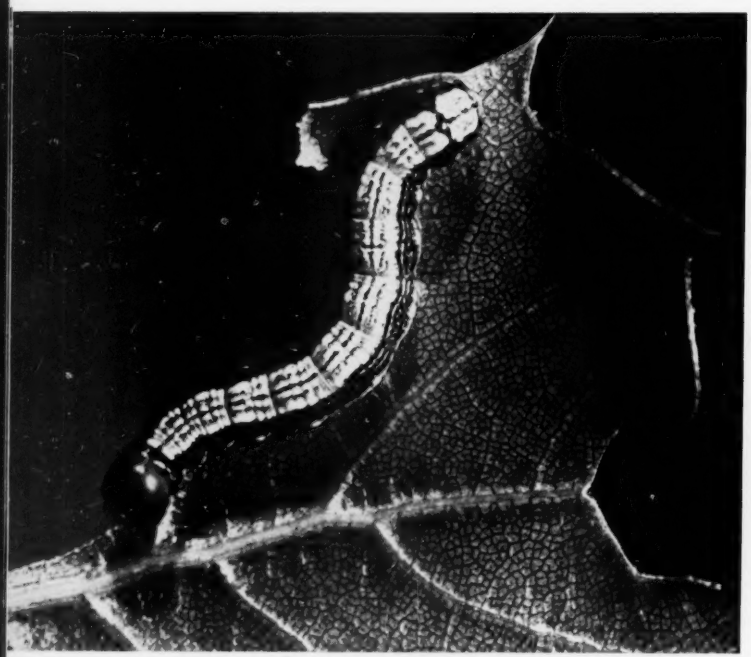
IF YOU LIKE TO PHOTOGRAPH ANIMALS but have become discouraged by the relative scarcity of "game" near at home, try your hand at some of the smaller forms of life such as the insects. With a minimum of additional equipment you will find ample, often unexplored, photographic opportunities in any garden, park, or patch of weeds.

There are two ways of photographing insects. One, as outlined in a leading miniature camera manual, is first to catch and kill the insect and then pose it in the desired position. At times there is no alternative to doing this but it is too much like a photographer propping up the carcass of a deer or bear and calling the results nature photography. The other method, of course, is to shoot living subjects candidly. Naturally the conscientious worker or true sportsman will prefer the latter method, which, however, makes it almost mandatory that one see the subject through the lens focused on a ground glass and seldom permits a set-up shot from a tripod. It rules out the many popular cameras which have indirect focusing view finders and those of the double-lens reflex type. The field is practically limited to single-lens reflex cameras in which a 45° mirror reflects the lens image on a ground glass or prism and snaps out of the way an instant before exposure.

With this type of camera it is possible to follow the movements of an animal as "seen" by the lens and to select just the right moment to click the shutter. There are larger cameras embodying this principle but I prefer a 35-mm. miniature. The small size of such a camera is an advantage in stalking and in getting into tight little environments. Furthermore, the film is relatively inexpensive and permits the free use of exposures—a decided advantage in this field. The disadvantages of a small negative can be successfully overcome by proper processing.

In order to magnify the subject, the focal length of the standard 50-mm. lens is increased by the use of relatively inexpensive metal extension tubes. A combination increasing the total focal length to about 100 mm. is most useful for insects about the size of the honey bee. Always desirable, though not always possible, a tripod is generally required for subjects in which longer extension tubes are used. These greater lengths magnify the movements of the camera as well as the size of the subject.

Exposures must be increased as the focal length is increased. I have found it most convenient to determine these in advance by trial and error and to rely on judgment and experience as well as the latitude of the emulsion to get satisfactory exposures. Living



*The larva of the California oak tree moth forms a sinuous decorative border for what is left of an oak leaf furnishing its dinner. Reticulations of the leaf's underside are an important element in the design.*

things will not pause and wait for calculations and exposure meter readings. My average exposure in sunlight with Plus X film and 100-mm. focal length is 1/25 second at f.11. I approach slowly (insects don't seem to detect slow movements as soon as fast) with the diaphragm and shutter already set for action. There is the difficulty of too little light at the finer apertures for easy focus but this may be overcome by using an automatic diaphragm set which enables focusing with the lens wide open. With this the diaphragm closes automatically to the desired position as the shutter release button is pressed.

One must take his backgrounds as he finds them. Much to be desired is simplicity so that the animal will stand out clearly. Conflicting mottled patches of light and shadow in or out of focus in the background will ruin an otherwise good picture unless one's ob-

→ *The beautiful chalky blue wings of this tiny lycaenid stand out sharply against the dark background. Had the butterfly chosen to alight farther down on the flower, this picture would have lost its snap.*

↓ *Alerted by the stealthily approaching cameraman, this grasshopper prepared for a take-off by rising on its tibiae and lifting its hind "feet" off the ground for additional thrust. An entomologist can learn much about the postures of insects by studying photos like this. In ground shots your elbows make a relatively steady tripod.*

*A ladybird beetle proves its worth as the gardener's ally by devouring an aphid on a squash leaf. It takes patient watching to get an action shot like this.*

ject is to illustrate natural camouflage. The best backgrounds are the simple surfaces of leaves or rocks. The former, however, often present another problem—the movement of the resting surface in and out of focus in the wind. A calm day is for this reason highly desirable for candid insect photography.

The major principle in this work is to secure the maximum depth of focus at the fastest possible speed. Stopping down the lens to f.11 or less gives good depth, but this usually makes necessary slowing the shutter to $\frac{1}{25}$ second. Even the steadiest hands will shake and spoil pictures at this speed. To overcome this, synchronized flash may be used to increase the light and thereby the shutter speed. The new stroboscopic or "electronic" flash outfits powered by batteries also open many possibilities to the more serious and, I might add, moneyed nature photographer.

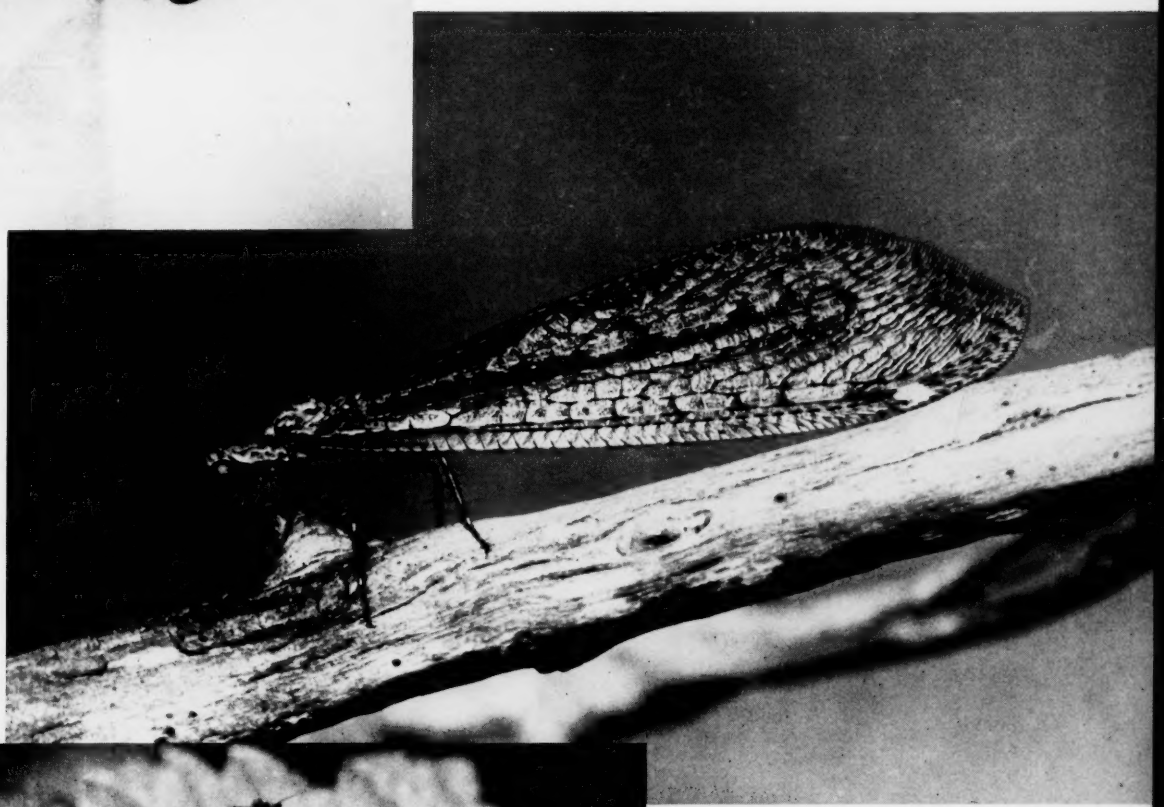
More and more people these days are turning their cameras from such subjects as family or friends standing in front of statues or monuments and are recognizing the possibilities nature photography offers as a hobby. Carrying a camera instead of a gun, others are discovering that, although one can't eat game bagged in a film magazine, all the woodcraft and thrills the regular hunter enjoys plus a deeper satisfaction in the results, await the nature cameraman—and there is no closed season. **END**

*Each one perched on an anther greedily devouring strawberry pollen, these tiny dermestid beetles illustrate how small insects may add interest to flower pictures.*

*Sluggish, voracious caterpillars like this horn-tailed larva of a sphinx moth are easy game for the photographer, allowing the use of a tripod and an artificial background to eliminate confusing patterns.*

**Photographs of living insects, by EDWARD S. ROSS**

← *Syrphid flies like to hover almost stationary and it's great sport to shoot them in midair. This one seemed to be fascinated by the sparkle of the lens and even had the nerve to alight on it. The top lighting gives interesting halation, but a flash would be needed to brighten up the side toward the lens. (Exposure 1/50 sec. at f.8.)*



↑ *The beautiful venation of the wing of this ant lion adult shows the silvery flashback or mirror effect from intense strobe light. In ordinary light these wings are transparent but not brilliant.*

← *One of our commonest insects, the drone fly makes a good target – once you know it is a harmless fly and not a honey bee!*

### Where authorities roam

THE NORTH AMERICAN BUFFALO: *A critical study of the species in its wild state.* By Frank Gilbert Roe. University of Toronto Press, 1951. viii + 957 pp., frontis. $12.

The author of this compendium spends more time taking after his sundry predecessors for what he views as misstatements on their parts than he does chasing the American bison from Hudson's Bay to the land of Coronado.

The publisher's announcement might lead one to believe that here was a long-needed, definitive work. From the enormous amount of work that has gone into this volume, it could have filled that need. Other considerations, however, render this not the case. The work is labored; it approaches the ultimate in cacoethic erudition.

The author has consulted some three hundred sources of information including most of the standard works. He leans for authority towards Hubert Howe Bancroft and dismisses many of William Hornaday's opinions as "unhistorical blatancy." Those of Martin S. Garretson are given "direct arithmetical criticism."

A good many of the opinions of men whose own day coincided with that of the bison in its wild state are rejected as "so-called historical evidence." Such revaluation is a part of historical writing. In the case at hand, however, in the opinion of this reviewer, the author fails to make his points stick.

The book weighs three pounds, two ounces.

BENJAMIN DRAPER

*California Academy of Sciences*

### The Pacific in books

TO SAY THAT WORLD WAR II, Far Eastern and Pacific Ocean Division, stimulated curiosity and concern about that part of the globe between the Strait of Malacca and Pearl Harbor is, by now, trite. But one fruit of that stimulus isn't stale yet, nor its market glutted: the growing list of critical, factual books about the Pacific world.

Up to 1941 the plain reading man might choose between sarong-wrapped South Sea idyls and the abstruse output of anthropologists, sociologists, and other recondite gentlemen. Nordhoff and Hall were topnotch reading: the *National Geographic* perennially served up a four-color dish of native "belles" garnished with palm leaves and hybiscus (it still does)—and of course there was always Miss Lamour to relieve the eyestrain of too much printed matter. But if you happened on something technical, it was like wading in molasses.

Suppose, however, you'd had a mental, or by luck an actual, peek behind the coconut curtain—a flash of reality. You put down the current romance and cast about for a book of facts in straight English. Or perhaps you'd just finished *Mutiny on the Bounty* and were ready to discover Cook, Dampier, and the rest of the "Voyages." As a fireside explorer you might have had the luck at this point to have come across J. C. Beaglehole's *The Exploration of the Pacific* (London: A. & C. Black, 1934; second ed. 1947)—the whole drama from Magellan to Vancouver in 400 pages, a scholar's history with the pace and feel of a first-rate novel. Then there was Peter H. Buck's *Vikings of the Sunrise* (New York: Frederick A. Stokes Company, 1938) to remind you that Te Rangi Hiroa's maternal ancestors in their splendid ocean-conquering canoes got there first. The late Hendrik Willem Van Loon made an entertaining if characteristically Van Loony effort to bridge the gap between discovery and its aftermath *(The Story of the Pacific,* New York: Harcourt, Brace and Company, 1940). Through his following he at least helped spread the word, jolting comfortable convictions of Western superiority; and you may have been aroused enough to proceed to a weightier work, *The South Seas in the Modern World,* by Felix M. Keesing (New York: John Day Company, 1941), "the best book on the effects of colonialism, written by the acknowledged authority" (Douglas L. Oliver).

Nevertheless, in spite of the few available good plain-language books, and the spate of technical literature, the majority of us who would never know a sib from a slit-gong had to face the Pacific island world, when it burst into our lives and times, with our ignorance showing. If you suddenly found yourself, soon after December 7, 1941, a GI shoving off from a West Coast P.O.E. or naval base, or the parent or wife of same, how concrete and current were your ideas of that exploding section of the globe into which you were heading, you or your son or your husband?

The Armed Forces held briefing sessions (emplasis on brief) and issued pamphlets on how to survive in the jungle or in the drink; newspapers and magazines lept into the breach at home, and books began to appear, some with "quickie" earmarks—several million people urgently wanted or needed to fill a lifelong vacuum of knowledge. (An immediately critical part of that vacuum this writer found himself adrift in was represented by the appalling lack of accurate information required for the compilation of currently usable naval charts—too often a "British Admiralty survey of 1820" or so was the "latest dope" we had!)

To analyze the output of the war-time press would make another book; enough to say the need was at least partly filled, with statistical tables for logisticians, "background" matter for editors and commentators, and *Tales of the South Pacific* (the book, 1947) to remind everyone who stayed home that it had to do with flesh and blood, too.

Two war-born volumes have kept a useful place on *PD's* editorial shelf since we began. *The Pacific Islands Handbook 1944,* North American Edition, by R. W. Robson, F.R.G.S. (New York: The Macmillan Company, 1945) is a synoptic but fact-packed survey, historical and geographical, ranging from the Netherlands Indies to Easter Island and the Galápagos and from the Aleutians to Pitcairn.

Largely about nature and man in the same area but including Australia, New Zealand, and Japan, *The Pacific World* (subtitle: *Its vast distances, its lands and the life upon them, and its peoples*), edited by Fairfield Osborn, with an introduction by William Beebe (New York: W. W. Norton & Company, Inc., 1944), was designed as a GI's vade mecum. It is necessarily generalized, but this makes for emphasis on basic principles—the workings of such things as climates, winds, currents and tides, ocean life, and even the stars of those inverse latitudes. Even so, there is much specific information about physical features, ani-

mals, birds, insects, and plants. There are several two-page charts in full color, and drawings and maps.

After the war, when instead of being able to come home and forget it we found ourselves with the responsibilities of occupation and of trusteeship over a large slice of the Pacific, we had—and have today—even greater need of fact-guided intelligence and understanding. At war, we had first to look out for ourselves; now our concern is for the well-being of thousands of fellow men, whose world has been blasted into a new and different shape by the impact of aliens. To understand what happened, and the nature of the problems created, we must learn in some degree what Europeans and Americans and Asiatics did in the Pacific between 1520 and 1945, even though the process involves some unpleasant reading.

But for the war, and the post-war state of the world, the United States might today be fairly well and gracefully "out" of the Pacific southwest of Hawaii, except Guam, Samoa, and our mid-ocean airstrip atolls. Our political retirement from the Philippines could have given us a nice feeling of having made up in some measure to Pacific peoples today for wrongs our fathers did their fathers yesterday. Looking at the Pacific as a whole, Professor Douglas L. Oliver could say this: ". . . By 1939 there were beginning to appear some genuine credits. Nearly everywhere energetic efforts were being made to improve islanders' health, to provide for their welfare, to protect their remaining lands from further alienation and their labor from abuses. Some administrations were even making moves to return to the islanders some control over their own affairs. Most hopeful of all, however, was the fact that, save in a few cases, island populations were arresting and even reversing their numerical declines. With protection against the more vicious forms of exploitation and with time for peaceful and gradual assimilation of things alien, it looked as if the islanders might regain some of their savage well-being even in a westernized world. But that, as everyone knows, was not to be" (*The Pacific Islands*, 1951, p. 257—see review below).

Back again, as Trustees over Micronesia, we Americans have no choice but to face our responsibilities and do our level best for the islanders whose welfare is in our hands through no wish or fault of theirs. Every American can share, first by informing himself. To help us, new books are coming along, with emphasis on the Pacific today, how it got that way, and what can be, should be, or is being done about it.

*Anatomy of Paradise*, by J. C. Furnas (New York: William Sloane Associates, Inc., 1947), "a penetrating and interesting account of the recent history of the eastern part of Oceania" (Oliver), was reviewed in these pages by Dr. Katharine Luomala (*PD*, Nov.-Dec. 1949). *Geography of the Pacific*, edited by Otis W. Freeman (New York: John Wiley & Sons, Inc., 1951) is a valuable, up-to-date compilation of reference material in textbook form (reviewed in *PD*, May-June 1951). As they appear, *PD* will review these books written for serious students and intelligent citizens who want to keep informed about the Pacific world—wherein "the destinies of our island wards remain in the hands of a small number of administrators and doctrinaire publicists—which *may* be all right but *could* be all wrong, and in any case is hardly a democratic procedure for handling a national problem . . . ."

THE PACIFIC ISLANDS. By Douglas L. Oliver. Decorations and maps by Sheila Mitchell Oliver. Harvard University Press, Cambridge. 1951. xi + 313 pp., illus., endpaper sketch map. $5.00.

" . . . One reason, therefore, for writing this book," Professor Oliver continues the quote above, from his Introduction, "was to provide the nonspecialist American with some background for understanding the historical consequences of westernization and for exercising the responsibilities of trusteeship."

A more urgent reason, the author, who is associate professor of anthropology in Harvard University, goes on to say, "for issuing one more book about the Pacific Islands at this time" is that "while American administration extends only to a few of these islands, the United States cannot remain indifferent to any part of the larger Oceanic area in which Hawaii, Guam, Eastern Samoa, and the Trust Territory Islands are fixed by geography and history." On two counts it is good that author and publisher were persuaded there was room for "one more book." First, Mr. Oliver is eminently qualified—he worked two years as anthropologist in New Guinea and the Solomons; he worked throughout Oceania for our government during the war, as Special Representative of the Foreign Economic Administration, Pacific Ocean Area, and was Director of the United States Commercial Company's Economic Survey of Micronesia, 1946. Second, Mr. Oliver can write.

*The Pacific Islands* has a plan which helps tie together the seemingly disjointed elements of a bafflingly complex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### Keep "Three Sisters" one

EDITOR, *Pacific Discovery*

SIR:

One more primeval forest in the West is threatened by exploitation. The U. S. Forest Service may yield 103 square miles of the Three Sisters Wilderness Area in Oregon's Cascades. True, in compensation the Forest Service proposes the creation of three separate and smaller wilderness areas in the same region. Yet from the standpoint of a naturalist this substitution seems unfortunate.

The area under consideration represents the lower zones of the Wilderness, whereas the proposed new areas would substitute an equivalent, more or less, of the higher zones of the present area. Thus, the "surgery" would destroy the ecological continuity of the Three Sisters Wilderness Area, and with it the unique biological field laboratory which ranges from 1,900 to more than 10,000 feet in elevation. The damage would be substantial. With rapidly increasing commercial exploitation, preservation of at least part of the Oregon Cascades' lower slope forest in its primeval condition seems essential.

The Three Sisters Wilderness Area, unique as it is in its wide divergence of ecological zones, is poorly explored scientifically, particularly in the lower organisms such as crustaceans, insects, amphibians, and the like. Numerous endemic forms inhabit very limited territory here, as I have observed in sporadic visits during the past 10 years. For example, an area of less than one square mile represents the known range of a remarkable camel cricket, *Pristoceuthophilus sargenti,* described from here, but one of an array of new species credited to this area—insects, spiders, and a salamander. Commercial disturbance of the lower zones might make it utterly impossible to study the ecology and geographical range of these and other forms of life.

From a different angle—the walk from the high Cascades to the lowest zone is an unforgettable experience. From alpine meadows we descend into a great forest which gradually changes from pine to spruce and finally to pure stands of immense Douglas fir. There is great beauty in it, as yet unscarred by commercial exploitation.

I believe that esthetic and scientific as well as practical reasons speak against the proposed readjustment of the boundaries of the Three Sisters Wilderness Area.

BORYS MALKIN

University of Washington, Seattle, 24 July 1951.

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subject. History, geography, ethnography, and economics are skilfully interwoven so as to bring out relationships. The 23 chapters are grouped in four sections. The first six, under "The Islanders," describe the physical setting, trace the origins of the main ethnic streams—Australian aborigines, Melanesians, Polynesians, Micronesians—that diffused by island hopping to occupy, before the fateful centuries of European "discovery," every habitable speck of land showing above Pacific surf, and make a considerable amount of anthropological detail into most fascinating reading. Take the Dobuans, for instance. Do you ever long to exchange the treadmill of civilization for the simple, carefree life of the happy "savage"? Wonder how to make ends meet? Have trouble with your in-laws? Read about this morbid little Melanesian back alley and give thanks for your blessings!

"The Aliens" comprises four chapters—Explorers: 1520–1780; Whalers, Traders, and Missionaries: 1780–1850; Planters, Blackbirders, and Merchants: 1850–1914; Miners and Administrators: 1914–1939. Here is the story of white and Asiatic impact—it is discovery, adventure, brutality, devotion, greed, power; there are scant grounds for Western—or Oriental—pride. Do you know what a "blackbirder" was?

Chapters 11 through 19 are called "Metamorphosis." In this part dealing with the results of alien overlordship appear detailed descriptions of the separate insular divisions of Oceania, grouped according to some prime factor. Thus Chapter 15, Sugar Revolution, describes Hawaii and Fiji; the Gilberts, Ellices, Cooks, etc., and Coastal New Guinea come under Coconut Civilization; while Inland New Guinea is under Mining. Thematic instead of geographical linkage brings out cultural and economic relationships, while keeping more of the picture in view at one time.

The final four chapters, "Cataclysm and Aftermath," begin with World War II, outline its effects, end with Prospects and some timely advice against an irrational prognosis of Communism in Oceania. "Some white colonials have rushed almost eagerly to the conclusion that the rash of postwar nativist movements are sinister manifestations of the long arm of Moscow . . . Similar movements have been a feature of culture contact in Oceania for a century or more; in fact they are typical reactions of subordinated peoples whose old values have been destroyed and whose new aspirations cannot be realized." Some of the Masters have been painfully slow to take the hint how best to keep their charges from turning red. Moreover, the answer to the question: "Just how susceptible would the islanders be to the doctrines of Marx? . . . lies in the distintion between 'communism' and 'communalism.' " The age-old *communal* pattern of Oceanic life, while "a long way removed from nineteenth-century western concepts of individualism," would seem to leave "little *native* scope for the spread of Marxist doctrine. . . On the other hand, if Armageddon does come to the islands, it is unreasonable to expect that the islanders will rise to a man to defend the civilization that has taken so much from them and given them so little in return."

On this sober note the book ends, having taught much we should know, and having prodded us to think.

SOUTHEAST ASIA. By E. H. G. Dobby. John Wiley & Sons, Inc., New York. 1951. 415 pp., 118 text maps and charts, end-paper maps. $5.00.

This basic text, by a professor of geography in the University of Malaya, Singapore, "is one of the first studies of geographic patterns in Southeast Asia, that region whose economic, social, and political problems gain worldwide significance with the increasing importance of the Pacific area." Writing for the serious student, Dr. Dobby takes up in detail "The Natural Landscape," "The Countries," and "The Human Geography" of the insular and peninsular region from Burma to Netherlands New Guinea, including the Philippines. He closes, as Oliver does, with an analysis of political and economic trends. D.G.K.

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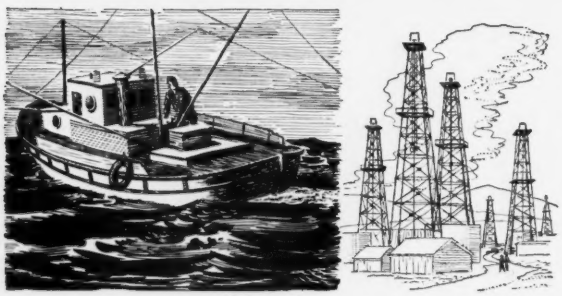
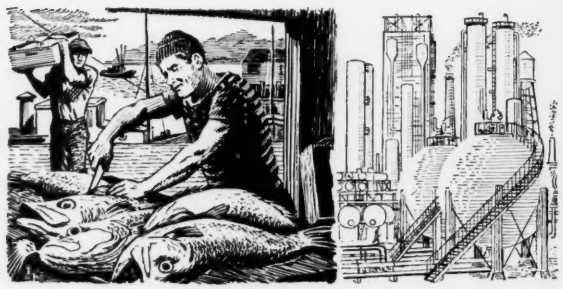
# "What's this 'integration' they're attacking you for?"

**One of the complaints** *now made about big companies like Standard Oil Company of California is that they practice "integration". This word is made to sound so evil that you may wonder what it means as it's used in this case.*

**The fact is that integration is common** in American businesses both large and small. They use it as a natural part of their system of increasing efficiency, cutting costs and improving products. Integration doesn't make a *good* company *bad*. To understand integration at a glance, look at this parallel:

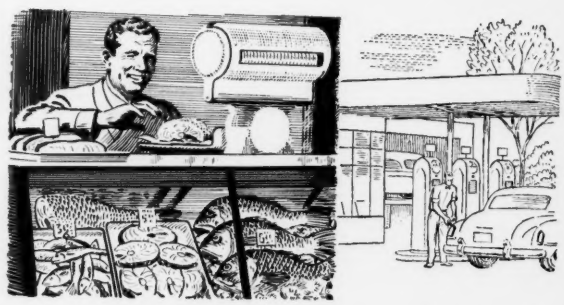


**A fisherman takes his boat** onto the ocean and makes his catch. Standard discovers oil and brings it up out of the ground. If both then *sell*—the fisherman to a buyer at wharfside, and Standard to some buyer at the well—there's no integration. But suppose each takes the next step . . .



**When the fisherman cleans his own fish,** he has become an integrated business. So, too, Standard. Like him, we work to put the product into the form you want. We refine the crude oil we ourselves produce—turn it into gasoline, lubricants, chemicals, and all the rest. This is integration.

**If the fisherman now carries** his cleaned catch to the market-place, he is further integrated, for he is now also in the transportation business . . . as is Standard when we operate our own pipelines and tankers to carry oil from well to refinery, or refined products to areas where they'll be used.



**And if the fisherman then sells his product** through a store of his own, he completes his integration. Standard does it, too, through Company-owned stations (about 1 in 7 stations where Chevron gasolines are sold). Integration helps us do better for you and the nation, and so for ourselves.

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